TM 11-5815-334-12

C 5

CHANGE No. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC *18 June 1976*

**Operator's and Organizational Maintenance Manual**

**Including Repair Parts and Special Tools Lists**

# RADIO TELETYPEWRITER SETS AN/GRC-142, AN/GRC-142A, AN/GRC-142B, AN/GRC-122, AN/GRC-122A, AND AN/GRC-122B

TM 11-5815-334-12, 22 May 1970, is changed as follows:

1. New or changed material is indicated by a vertical bar in the margin.
2. Remove and insert pages as indicated in the page list below:

| Remove | Insert |
|---|---|
| 1-1 through 1-6 | 1-1 through 1-6 |
| 1-6.1 and 1-6.2 | 1-6.1 and 1-6.2 |
| 2-3 through 2-12 | 2-3 through 19 |
| 5-1 and 5-2 | 5-1 and 5-2 |
| 5-2.1 | 5-2.1 |

3. File this change sheet in the front of the publication for reference purposes.

By Order of the Secretary of the Army:

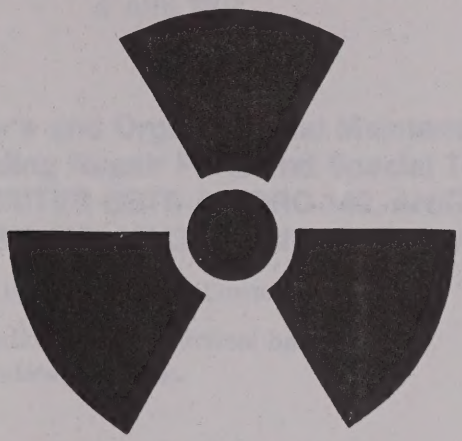
FRED C. WEYAND
*General, United States Army*
*Chief of Staff*

Official:
PAUL T. SMITH
*Major General, United States Army*
*The Adjutant General*

DISTRIBUTION:
To be distributed in accordance with DA Form 12-51, (qty rqr block no. 2369) Operator Maintenance requirements for AN/GRC-122 and AN/GRC-142.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1976—603-770 / 316

# WARNING
# RADIATION HAZARD



## RADIOACTIVE MATERIAL
## CONTROLLED DISPOSAL REQUIRED
## ACCOUNTABILITY NOT REQUIRED

STD RW—2

| | | | |
|---|---|---|---|
| Meter | Ra226 | 1.0uCi | 6625-00-257-1103 |
| Meter | Ra 226 | 0.6uCi | 6625-00-226-5680 |
| Meter arbitrary scale | Ra 226 | 1.0uCi | 6625-00-226-5679 |
| Meter, arbitrary scale | Ra 226 | 1.0uCi | 6625-00-226-5681 |

Radiation Hazard Information: The following radiation hazard information must be read and understood by all personnel operating or repairing Radio Teletypewriter Sets AN/GRC-142, AN/GRC-142A, AN/GRC-142B, AN/GRC-122, AN/GRC-122A, and AN/GRC-122B. Hazardous radioactive materials are present in the above listed components of the MD-522/GRC, RT-662/GRC, RT-824/GRC, and the AM-3349/GRC. The components are potentially hazardous when broken. See qualified medical personnel and the local Radiological Protection Officer (RPO) immediately if you are exposed to or cut by broken components. First aid instructions are contained in TB 43-0116, TB 43-0122, and AR 755-15.

NEVER place radioactive components in your pocket.

Use extreme care NOT to break radioactive components while handling them.

NEVER remove radioactive components from cartons until you are ready to use them.

If any of these components are broken, notify the local RPO immediately. The RPO will survey the immediate area for radiological contamination and will supervise the removal of broken components.

The above listed radioactive components *will not* be repaired or disassembled.

Disposal of broken, unserviceable, or unwanted radioactive components will be accomplished in accordance with the instructions in AR 755-15.

TM 11-5815-334-12
C 4

CHANGE
NO. 4

HEADQUARTERS
DEPARTMENT OF THEARMY
WASHINGTON, DC, *1 August 1975*

# Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools Lists RADIO TELETYPEWRITER SETS AN/GRC-142, AN/GRC-142A, AN/GRC-142B, AN/GRC-122, AN/GRC-122A, AND AN/GRC-122B

TM 11-5815-334-12, 22 May 1970, is changed as follows:

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| *Remove* | *Insert* |
|---|---|
| 2-5 and 2-6 | 2-5 and 2-6 |
| 5-2.1 | 5-2.1/(5-2.2 blank) |
| B-1 through B-6 | B-1 through B-7/(B-8 blank) |

3. File this change sheet in front of the manual for reference purposes.

By Order of the Secretary of the Army:

FRED C. WEYAND
*General, United States Army*
*Chief of Staff*

Official:

VERNE L. BOWERS
*Major General, United States Army*
*The Adjutant General*

Distribution:
To be distributed in accordance with DA Form 12-51, Operator requirements for AN/GRC-122 and AN/GRC-142.

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TM 11-5815-334-12
C 3.

CHANGE
No. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *2 April 1975*

**Operator's and Organizational Maintenance Manual**

**Including Repair Parts and Special Tools Lists**

# RADIO TELETYPEWRITER SETS AN / GRC-142, AN / GRC-142A, AN / GRC-142B, AN / GRC-122, AN / GRC-122A AND AN / GRC-122B

TM 11-5815-334-12, 22 May 1970, is changed as follows:

1. New or changed material is indicated by a vertical bar.
2. Remove old pages and insert new pages as indicated below.

| *Remove pages* | *Insert pages* |
|---|---|
| None | Radiation warning |
| 1-1 through 1-8 | 1-1 through 1-8 |
| 2-9 through 2-12 | 2-9 through 2-12 |
| 3-13 through 3-18 | 3-13 through 3-18.1 |
| 3-31 and 3-32 | 3-31 and 3-32 |
| 5-1 and 5-2 | 5-1, 5-2 and 5-2.1/(5-2.2 blank) |
| A-1 and A-2 | A-1 and A-2 |
| 6-5 | 6-5 |
| 6-9 | 6-9 |

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*The Adjutant General.*

Distribution:

To be distributed in accordance with DA Form 12-51, Operator requirement for AN/GRC-122 and AN/GRC-142.

U.S. GOVERNMENT PRINTING OFFICE: 1975—665-320 / 5068

CHANGE
No. 1



HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *22 May 1972*



# Operator and Organizational Maintenance Manual
## Including Repair Parts and Special Tool Lists

## RADIO TELETYPEWRITER SETS AN/GRC–142, AN/GRC–142A, AN/GRC–142B, AN/GRC–122, AN/GRC–122A, AND AN/GRC–122B

TM 11–5815–334–12, 22 May 1970, is changed as follows:

1. Remove old pages and insert new pages as indicated below:

| *Remove pages* | *Insert pages* |
|---|---|
| i through iv | i through vi |
| 1–1 through 1–8 | 1–1 through 1–8 |
| 1–11 through 1–30 | 1–11 through 1–30.3 |
| 2–1 and 2–2 | 2–1 and 2–2 |
| 2–5 through 2–12 | 2–5 through 2–12 |
| 3–1 and 3–2 | 3–1 and 3–2 |
| 3–5 and 3–6 | 3–5 and 3–6 |
| 3–9 through 3–14 | 3–9 through 3–14 |
| 3–17 through 3–22 | 3–17 through 3–22 |
| 3–25 and 3–26 | 3–25 and 3–26 |
| 3–29 through 3–32 | 3–29 through 3–32 |
| 3–37 through 3–40 | 3–37 through 3–40 |
| 4–1 through 4–4 | 4–1 through 4–4 |
| 4–7 through 4–12 | 4–7 through 4–9 |
| 5–1 and 5–2 | 5–1 and 5–2 |
| 5–11 through 5–16 | 5–11 through 5–19 |
| 6–3 | 6–3 |
| 6–7 | 6–7 |
| 6–11 | 6–11 |
| | 6–13 |
| A1 and A2 | A1 and A2 |
| B–1 through B–8 | B–1 through B–6 |
| C–1 through C–6 | |

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Distribution:
To be distributed in accordance with DA Form 12–51, Operator requirements for AN/GRC–122 and AN/GRC–142.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1972—714–215/5134

TECHNICAL MANUAL
No. 11–5815–334–12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *22 May 1970*

# Operator and Organizational Maintenance Manual Including Repair Parts and Special Tool Lists

# RADIO TELETYPEWRITER SETS AN/GRC–142, AN/GRC–142A, AN/GRC–142B, AN/GRC–122, AN/GRC–122A, AND AN/GRC–122B



*This manual supersedes TM 11–5815–334–12, 22 September 1967, including all changes.

*LIST OF ILLUSTRATIONS*

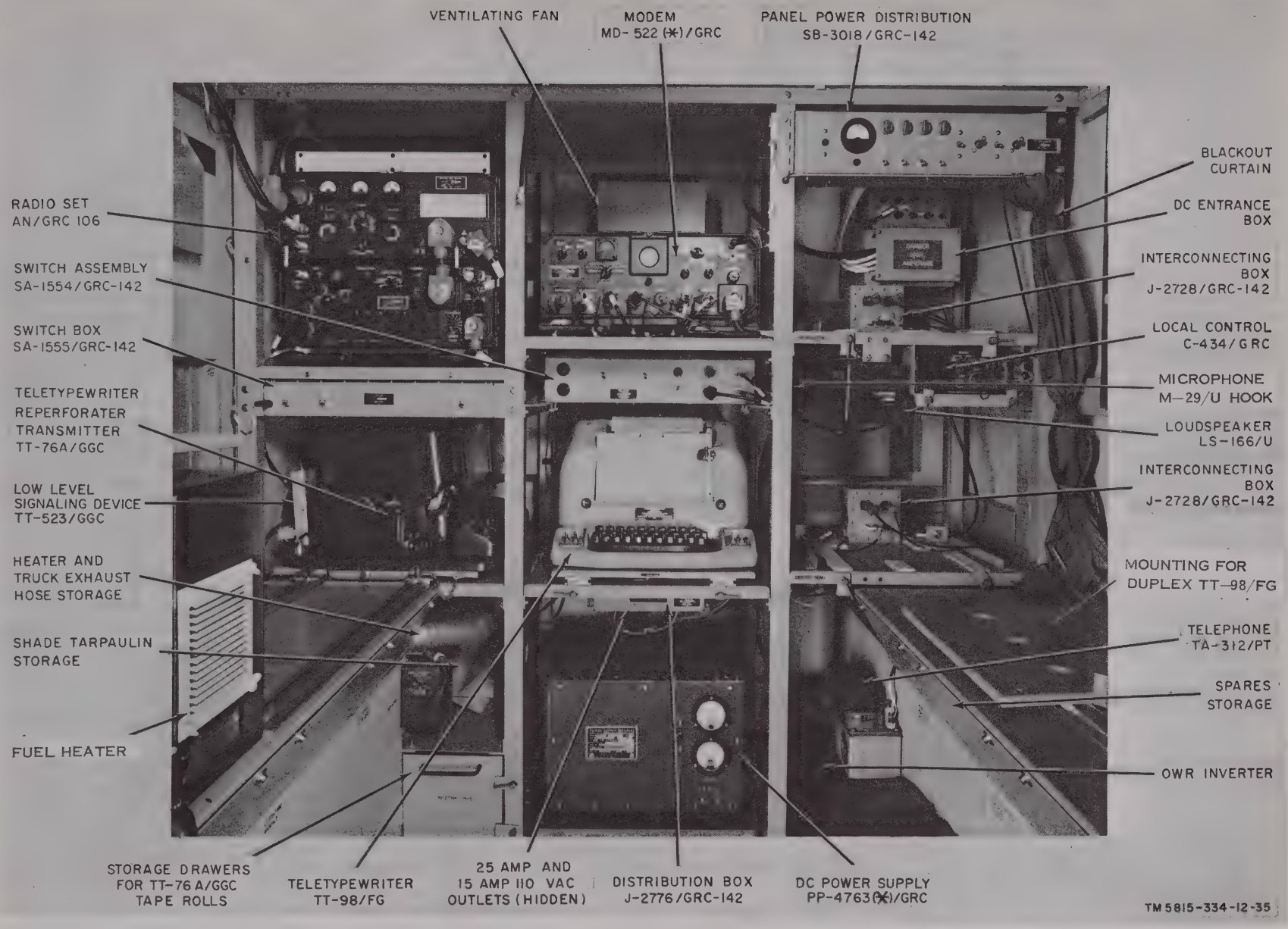



*Figure 1–1. Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122 (less duplex equipment), shelter interior, cab end.*

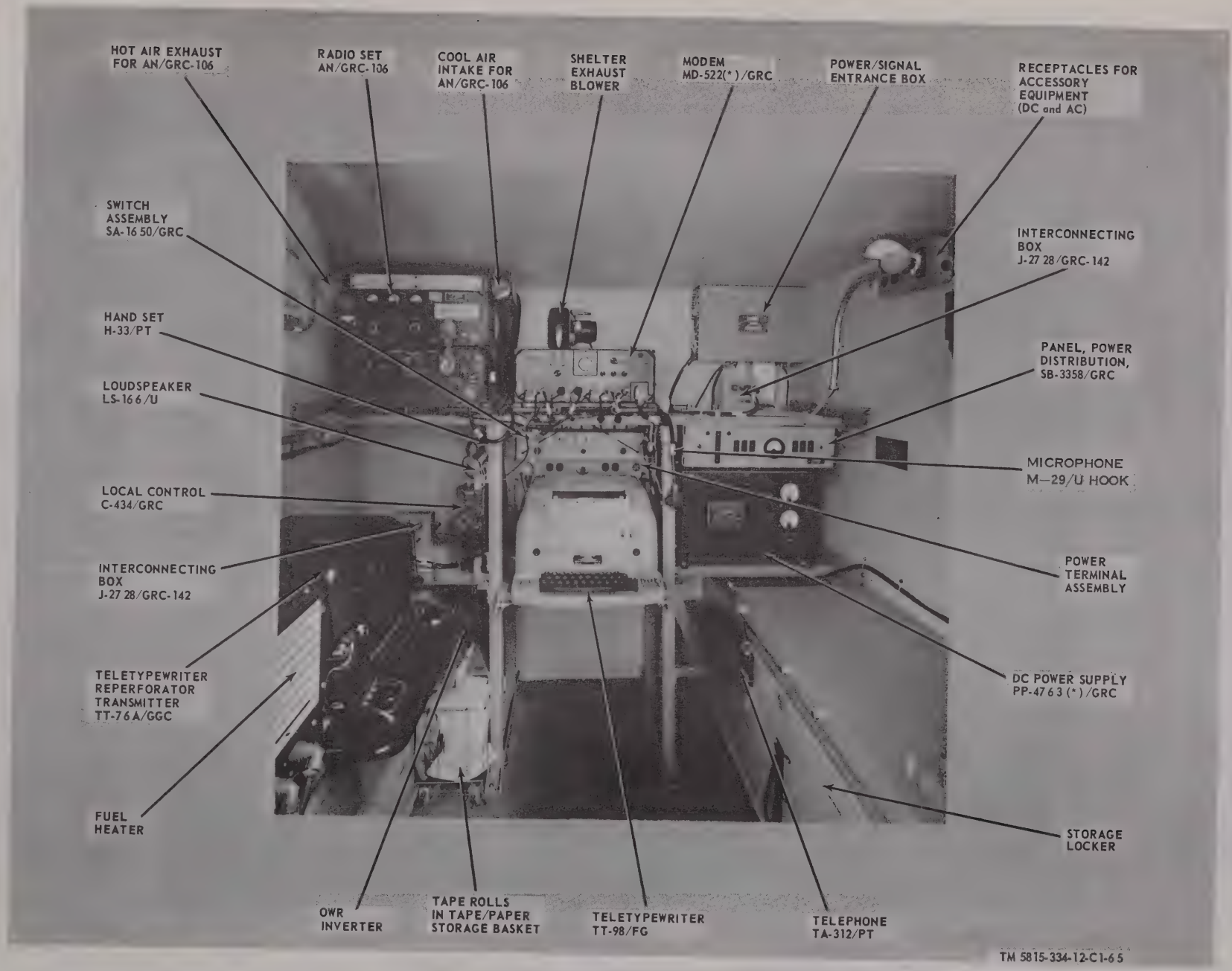



*Figure 1–2. Shelter interior, cab end (typical of AN/GRC–142A, –142B or AN/GRC–122A, –122B configurations), less AN/GRC–122A, –122B duplex equipment.*

# CHAPTER 1

# INTRODUCTION

## Section I. GENERAL

### 1-1. Scope

*a.* This manual describes Radio Teletypewriter Sets AN/GRC-142(*) and AN/GRC-122(*) (radio teletypewriter sets). Radio Teletypewriter, Modem MD-522(*)/GRC indicates Radio Teletypewriter, Modems MD-522/GRC and MD-522A/GRC. Power Supply PP-4763(*)/GRC indicates Power Supplies PP4763/GRC and PP-4763A/GRC: and Low-Level Signaling Device TT-523(*)/GRC indicates Low-Level Signaling Devices TT-523/GGC and TT-523A/GGC. Technical data includes operation under usual and unusual conditions, cleaning and inspection of the equipment, and replacement of parts available to operator and organizational maintenance personnel.

*b.* Official nomenclature followed by (*) indicates all models of the equipment included in this technical manual; thus, Radio Teletypewriter Set AN/GRC-142(*) indicates Radio Teletypewriter Sets AN/GRC-142, -142A and -142B. Radio Teletypewriter Set AN/GRC-122(*) indicates Radio Teletypewriter Sets AN/GRC-122, -122A, and -122B. Shelter, Electrical Equipment S-318(*)/G indicates all configurations of the shelter.

*c.* Appendix C is current as of 15 May 1973.

### 1-2. Indexes of Publications

*a. DA PAM 310-4.* Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

*b. DA Pam 310-7.* Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

### 1-3. Forms and Records

*a. Reports of Maintenance and Unsatisfactory Equipment.* Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM38-750.

*b. Report of Packaging and Handling Deficiencies.* Fill out and forward DD From 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DSAR 4145.8.

*c. Discrepancy in Shipment Report (DISREP) (SF 361).* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33A/AFR 75-18/MCO P4610.19B, and DSAR 4500.15.

*d. Recommendation for Maintenance Publication Improvements.* Report of errors, omissions and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, U.S. Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703.

## Section II. DESCRIPTION AND DATA

### 1-4. Purpose and Use

*a.* Radio Teletypewriter Sets AN/GRC-142(*) and AN/GRC-122(*) are shelter-contained radio teletypewriter systems. The AN/GRC-142(*) provides one-way reversible communication. One-way reversible (owr) means that the system can transmit and receive, but not simultaneously). The AN/GRC-122(*) is similar to the AN/GRC-142(*) except that the AN/GRC-122(*) provides duplex operation. This means that simultaneous transmission and reception is possible. The AN/GRC-122(*) also provides a *pony circuit* (teletypewriter order wire (ow) transmission and reception over landlines) when *not* operating on the duplex mode. Both radio teletypewriter sets include provision for local (mobile or fixed) or remote operation, and are vehicular- or air-transportable. Remote operation requires additional equipment not supplied as part of the AN/GRC-142(*) or AN/GRC-122(*). The AN/GRC-142, -142A, or AN/GRC-122, -122A (S-318(*)/G shelter) are usually mounted on ¾-ton trucks. The AN/GRC-142B or the AN/GRC-122B (S-250/G shelter) is usually mounted on 1¼ ton trucks.

*b.* The AN/GRC-142(*) and AN/GRC-122(*) operate in the frequency range of 2.0 to 29.999 megahertz (MHz). They are capable of the following modes of operation:

(1) 85-, 85-diversity, or 850-hertz (Hz) frequency-shift keyed (fsk) local owr operation.

(2) Compatible amplitude-modulation (am.) or single-sideband (ssb) voice owr local or remote operation.

(3) Simultaneous local 85-Hz narrow frequency-shift keyed (nsk) and voice owr reception.

(4) Continuous wave (cw) local or remote operation.

*c.* With the additions of Teletypewriter TT-98/FG at the remote site, the following modes of remote operation are possible:

(1) 85-, 85-Hz diversity, remote owr operation.

(2) 85-Hz nsk plus voice remote owr operation.

*d.* The AN/GRC-122(*) contains an additional Receiver-Transmitter RT-662/GRC, called the duplex RT662/GRC, with an associated antenna; an auxiliary louspeaker; an inverter, called the duplex inverter; and an additional Teletypewriter TT-98/FG, called the duplex TT-98/FG. This arrangement permits local and remote teletypewriter (tty), duplex operation. Remote duplex voice operation however is not possible.

*e.* The addition of a second TT-98/FG at the remote site gives the AN/GRC-122(*) capability for the additional modes of operation listed below:

(1) Remote duplex 85-, 85-diversity, or 850-Hz fsk operation.

(2) Tty order wire operation between the shelter and the remote site when not operating in the duplex mode.

*f.* The additional units (*d* above) are not supplied with the AN/GRC-142(*). However, the AN/GRC-142(*) is wired to accommodate these additional units. With these additional units installed, the AN/GRC-142(*) is identical with the AN/GRC-122(*).

*g.* Remote field telephone facilities are also provided in both radio teletypewriter set configurations. This arrangement allows the local operator in the shelter to communicate with a remote operator over landlines.

*h.* Facilities are included in both configurations to accommodate security equipment. This security equipment is not supplied as part of the AN/GRC-142(*) or AN/GRC-122(*).

*i.* The AN/GRC-142(*) and AN/GRC-122(*) may be netted with each other or with equipment such as Radio Teletypewriter Sets AN/VSC-2, AN/VSC-3, the AN/GRC-46-series, AN/VRC29, AN/GRC-114, and the AN/GRC-26 series.

## 1-5. Technical Characteristics

Total power consumption of the radio teletypewriter sets covered in this manual are given below.

| | |
|---|---|
| AN/GRC-142 ... | 28.5 volts dc at 87 amperes. |
| AN/GRC-122 ... | 28.5 volts dc at 90 amperes. |
| AN/GRC-142A, -142B | 28.5 volts dc at 68 amperes. |
| AN/GRC-122A, -122B | 28.5 volts dc at 80 amperes. |
| Maximum alternating current power consumption: | |
| Air-conditioner | 110 volts ac 60Hz at 20 amperes. |
| Power Supply PP-4673(*)/GRC | 110 volts ac 60 Ha, 25 amperes. |

Power consumption, shelter, and major components (maximum):

| | |
|---|---|
| Shelter, Electrical Equipment S-318(*)/G: | |
| Lights ..... | 50 watts dc. |
| Exhaust blower ..... | 165 watts dc. |
| Air conditioner[a] ..... | 2,100 watts ac. |
| Shelter heater (fuel) | 315 watts dc. |
| Shelter heater (electric)[b] | 1,500 watts ac. |
| Shelter, Electrical Equipment S-250/G: | |
| Lights ..... | 50 watts. |
| Exhaust blower ..... | 165 watts dc. |
| Shelter heater (fuel) | 315 watts dc. |
| Shelter heater (electric) | 1,500 watts ac. |
| Major components: | |
| Teletypewriter TT-98/FG (supplied by inverter) | 150 watts ac. |
| Teletypewriter Reperforator-Transmitter TT-76A/GGC (supplied by inverter) | 150 watts ac. |
| Duplex TT-98/FG (AN/GRC-122 only) (supplied by duplex inverter) | 150 watts ac. |
| Radio Set AN/GRC-106 | 1,045 watts direct current. |
| Duplex RT-662/GRC (AN/GRC-122 only) | 45 watts dc. |
| Radio Teletypewriter, Modem MD-522(*)/GRC | 40 watts dc. |
| Motor-generator (60-Hz) Wincharger Model SS-688, duplex motor-generator (60-Hz) Wincharger (nomenclatured PU-724/U) | |

[a] Supplied with AN/ GRC-142, serial numbers 1 through 697 only.

[b] Supplied only with shelters not containing air conditioners.

| | |
|---|---|
| Model SS-668 (AN/GRC-122 only) | Unloaded, 8 amperes at ©28.5 volts dc. With 1 tty equipment 12.5 amperes at 28.5 volts dc. With 2tty equipment 16.5 amperes at 28.5 volts dc. |
| Local area communication facilities: | |
| Telephone set (TA-312/PT) | Internal battery. |
| Weight: | |
| Shelter, Electrical Equipment S-318(*)/G (AN/GRC-142) | 1,694 pounds. |
| Shelter, Electrical Equipment S-318(*)/G (AN/GRC-122) | 1,832 pounds. |
| Shelter, Electrical Equipment S-138(*)/G (AN/GRC-142A) | 1,552 pounds. |
| Shelter, Electrical Equipment S-318(*)/G (AN/GRC-122A) | 1,700 pounds. |
| Shelter, Electrical Equipment S-250/G (AN/GRC-142B) | 1,900 pounds. |
| Shelter, Electrical Equipment S-250/G (AN/GRC-122B) | 2,164 pounds. |
| Outside dimensions of shelter: | |
| Shelter, Electrical Equipment S-318(*)/G: | |
| Length | 75.38 inches. |
| Height | 70.38 inches. |
| Width | 72.0 inches |
| Shelter, Electrical Equipment S-250/G: | |
| Length | 85 inches. |
| Height | 70 inches. |
| Width | 79 inches. |

*Supplied with AN/ GRC-142, serial numbers 1 through 697 only.
*Supplied only with shelters not containing air conditioners.

| | |
|---|---|
| Types of signals transmitted/received. | 85-Hz narrow frequency-shift keyed, or 850-Hz frequency-shift keyed. Compatibility am., ssb voice, and cw. Voice and teletypewriter simultaneously (voice plus nsk). Nsk diversity. |
| Mobile carrier | ¾-ton truck, type M-37 B1, with 100-ampere electrical system, or 1¼-ton truck M-715 with 100-ampere electrical system. |
| Transmitted power output (Maximum) | 400 watts, peak envelope power. |
| Effective transmit range | 20 miles (32.18 kilometers) nominal (groundwave); 100 (160.9 km) to 1,500 (2413.5 km) miles (skywave), depending on terrain, frequency antenna, time, and atmospheric conditions. |
| Frequency range | 2.0 to 29.999 Megahertz. |
| Antenna systems: | |
| For transmission | Whip or doublet. |
| For reception | Whip or doublet. |

### 1-6. Items Comprising an Operable Equipment

Those items which comprise an operable equipment for Radio Teletypewriter Sets AN/GRC-142(*), and AN/GRC-122(*) are listed in the chart below. The item used in an end item will be identified by a code number 1, 2, 3, 4, 5, and 6 for the AN/GRC-142, AN/GRC-142A, AN/GRC-142B, AN/GRC-122, AN/GRC-122A, and AN/GRC-122B respectively.

| FSN | Item | Quantity | Height or length (in.) | Depth (in.) | Width (in.) | Weight (lb) | Code |
|---|---|---|---|---|---|---|---|
| 5815-401-9720 | Radio Teletypewriter Set AN/GRC-142 | | | | | | 1 |
| 5815-401-9720 | Radio Teletypewriter Set AN/GRC-142A | | | | | | 2 |
| 5815-443-5511 | Radio Teletypewriter Set AN/GRC-142B | | | | | | 3 |
| 5815-401-9719 | Radio Teletypewriter Set AN/GRC-122 | | | | | | 4 |
| 5815-401-9719 | Radio Teletypewriter Set AN/GRC-122A | | | | | | 5 |
| 5815-937-5295 | Radio Teletypewriter Set AN/GRC-122B | | | | | | 6 |
| 5410-489-6076 | Shelter Electrical Equipment S-250( )/G (Shielded). | 1 | | | | | 3,6 |
| 5410-763-2339 | Shelter Electrical Equipment S-318( )G | 1 | | | | | 1,2,4,5 |
| 4140-926-9648 | Fan, Propeller, 28 vdc, part No. BD-302-OF-1, Magnetics Corp., Westbury, Long Island or equal. | 1 | | | | | 1,2,3,4,5,6 |
| | Chair, Aluminum, foam rubber cushioning, General Fireproof 2123 or equal, less casters. | 1 | | | | | 1,2,3,4,5,6 |
| 5340-286-2491 | Clamp, loop antenna rope | 2 | | | | | 1,2,3,5,6 |
| | Flags, safety | 2 | | | | | 1,2,3,4,5,6 |
| 6545-922-1200 | First Aid Kit | 1 | | | | | 1,2,3,4,5,6 |
| | Clock, Aircraft Type, Longine-Witnauer type A-11 or equal. | 1 | | | | | 1,2,3,4,5,6 |
| 5820-644-4554 | Control Group AN/GRA-6 | 1 | | | | | 1,2,3,4,5,6 |
| 4210-555-8837 | Bracket Assy, Mtg., and Fire extinguisher ($CO_2$), 2¾ lb, Fire Guard Corp. Worthbrook, Ill., or equal. | 1 | | | | | 1,2,3,4,5,6 |
| 5975-224-5260 | Ground rod MX-148/G | 2 | | | | | 1,2,3,4,5,6 |
| | Hammer, sledge | 1 | | | | 5 | 1,2,3,4,5,6 |
| 4720-937-7088 | Hose, exhaust vehicle | 2 | | | | | 1,2,3,4,5,6 |
| 7530-634-6237 | Tape, blank recording, teletypewriter 8 in. O.D.; 2 in. I.D. oiled. | | | | 0.875 | | 1,2,3,4,5,6 |
| | Lamp, incandescent, 30v 35w, GE25A30, or equal. | 2 | | | | | 1,2,3,4,5,6 |
| 4520-649-7571 or 4520-878-9393 | Heater space multifuel, 28 vdc type III, 15,000 BTU/HR including literature on operation. | 1 | | | | | 1,2,3,4,5,6 |
| 4520-224-7909 | Heater Space 115 vac* | 1 | | | | | 1,2,4,5 |
| | Heater, Space, electric | 1 | | | | | 3,6 |
| | Container, Liquid, 5-gallon for fuel tank | 1 | | | | | 1,2,3,4,5,6 |
| 4730-937-6442 | Fuel line adapter assy for 5-gallon liquid container. | 1 | | | | | 1,2,3,4,5,6 |
| 2590-473-6331 | Bracket assembly for 5-gallon liquid container | 1 | | | | | 1,2,3,4,5,6 |

| FSN | Item | Quantity | Height or length (in.) | Depth (in.) | Width (in.) | Weight (lb) | Code |
|---|---|---|---|---|---|---|---|
| 5820-078-5615 | Cross bar, welded, assembly short | 2 | | | | | 1, 2, 3, 4, 5, 6 |
| 5815-919-4800 | Modem, Radio Teletypewriter MD-522A/GRC | 1 | 7 | 13 | 18 | 36 | 1, 2, 3, 4, 5, 6 |
| 5820-078-5614 | Mounting MT-3140/GRC-106 | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 5995-682-3315 | Cable Inverter CX-4541 | 1, 2 | | | | | 1, 2, 3, 4, 5, 6 |
| 5820-082-3491 OR 5820-167-8003 | Radio Set AN/GRC-106( ) | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 5820-935-0033 | Receiver-Transmitter, Radio RT-834/GRC | 1 | 7 | 13 | 18 | 46 | 4, 5, 6 |
| 5820-937-5530 | Tarpaulin, shade | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 7720-244-9717 | Tuning fork | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 5805-543-0012 | Telephone TA-312/PT | 2 | 7½ | 4 | 10½ | 5 | 1, 2, 3, 4, 5, 6 |
| 5815-503-2764 | Teletypewriter TT-98( )/FG | 1, 2 | 11 | 20 | 17 | 54 | 1, 2, 3, 4, 5, 6 |
| 5995-117-4678 | Cable Assembly, Power Electrical CX-12330/G | 1 | 12 | | | | 2, 3, 5, 6 |
| 6125-617-1435 | Inverter, Motor Generator, 27.5 input 115 v, 60-Hz 400 w output, Wincharger Model SS-668, or equal. | 1, 2 | | | | | 1, 2, 3, 4, 5, 6 |
| 5815-553-6061 | Reperforator-Transmitter Teletypewritter TT-76A/GGC. | 1 | 21 | 18 | 12 | 45 | 1, 2, 3, 4, 5, 6 |
| 5985-937-6719 | Mounting base, whip antenna | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 5985-937-6718 | Mounting base, whip antenna | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 6625-682-4464 | Standing Wave Ratio-Power Meter ME-165/G | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 7530-281-2694 | Paper, teletypewriter | | | | 8½ | | 1, 2, 3, 4, 5, 6 |
| 5815-937-6146 | Low-Level Signaling Device TT-523/GGC | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 5920-669-9381 | Fuse 5-ampere slow-blow type 3AG, F02B32V5A | 2 | | | | | 1, 2, 3, 4, 5, 6 |
| 5920-755-3656 | Fuse 30-ampere, slow-blow type 3AG, F03B32V30A. | 2 | | | | | 1, 2, 3, 4, 5, 6 |
| 5920-199-9498 | Fuse ½-ampere, slow-blow type 3AG, F02B250V½A. | 2 | | | | | 1, 2, 3, 4, 5, 6 |
| 5920-727-1452 | Fuse 10-ampere, slow-blow type 3AG, F03B32V10A. | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 6240-155-8651 | Lamp 28 v GE 327 or equal | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 4720-595-0453 | Hose assembly | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| | Plug, AC used with PP-4763( )/GRC | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8620 | Cable Assembly, Special Purpose, Electrical CX-10507/G. | 1 | 53 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8621 | Cable Assembly, Special Purpose, Electrical CX-10508/G. | 1 | 72 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8622 | Cable Assembly, Special Purpose, Electrical CX-10509/G. | 1 | 147 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8623 | Cable Assembly, Special Purpose, Electrical CX-10510/G. | 1 | 139 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8624 | Cable Assembly, Special Purpose, Electrical CX-10511/G. | 1 | 71 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8625 | Cable Assembly, Special Purpose, Electrical CX-10512/G. | 1 | 66 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8626 | Cable Assembly, Special Purpose, Electrical CX-10513/G. | 1 | 117 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-2545 | Cable Assembly, Special Purpose, Electrical CX-10513/G. | 1 | 90 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-2542 | Cable Assembly, Special Purpose, Electrical CX-10514/G. | 1 | 81 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8627 | Cable Assembly, Special Purpose, Electrical CX-10514/G. | 1 | 108 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8460 | Cable Assembly, Special Purpose, Electrical CX-10515/G. | 1 | 72 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-0396 | Cable Assembly, Special Purpose, Electrical CX-10515/G. | 1 | 84 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8461 | Cable Assembly, Special Purpose, Electrical CX-10516/G. | 1 | 48 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8467 | Cable Assembly, Special Purpose, Electrical CX-10517/G. | 1 | 48 | | | | 1, 2, 3, 4, 5, 6 |

| FSN | Item | Quantity | Height or length (in.) | Depth (in.) | Width (in.) | Weight (lb) | Code |
|---|---|---|---|---|---|---|---|
| 5995-937-8462 | Cable Assembly, Special Purpose, Electrical CX-10518/G. | 1 | 72 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8832 | Cable Assembly, Power CX-10528/G | 1 | 80 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8464 | Cable Assembly, Special Purpose, Electrical CX-10520/G. | 1 | 48 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8628 | Cable Assembly, Special Purpose, Electrical CX-10521/G. | 1 | 124 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8834 | Cable Assembly, Power CX-10529/G | 1 | 24 | | | | 1, 4 |
| 5995-937-8841 | Cable Assembly, Special Purpose, Electrical CX-10522/G. | 1 | 72 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8833 | Cable Assembly, Power CX-10530/G | 1 | 118 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-0397 | Cable Assembly, Power CX-10530/G | 1 | 125 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8616 | Cable Assembly, Power CX-10531/G | 1 | 53 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8048 | Cable Assembly, Special Purpose, Electrical CX-10523/G. | 1 | 72 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-2521 | Cable Assembly, Special Purpose, Electrical CX-15023/G. | 1 | 66 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-2546 | Cable Assembly, Special Purpose, Electrical CX-10523/G. | 1 | 112 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-2534 | Lead Electrical CX-10614/G | 1 | 56 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8843 | Cable Assembly, Special Purpose, Electrical CX-10524/G. | 1 | 120 | | | | 1, 4 |
| 5995-937-8842 | Cable Assembly, Special Purpose, Electrical CX-10525/G. | 1 | 96 | | | | 1, 4 |
| 5995-937-8844 | Cable Assembly, Special Purpose, Electrical CX-10524/G. | 1 | 104 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8631 | Cable Assembly, Special Purpose, Electrical CX-10526/G. | 1 | 36 | | | | 1, 4 |
| 5995-935-0398 | Cable Assembly, Special Purpose, Electrical CX-10527/G. | 1 | 40 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8614 | Cable Assembly, Special Purpose, Electrical CX-10527/G. | 1 | 37 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8617 | Cable Assembly, Special Purpose, Electrical CX-10533/G. | 1 | 188 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8613 | Cable Assembly, Special Purpose, Electrical CX-10534/G. | 1 | 200 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-089-7798 | Lead Electrical CX-10760/U | 1 | 74 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-3458 | Cable Assembly, Radio Frequency CG-3366/U | 1 | 18 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-01-012-3629 | Cable Assembly, Special Purpose, Electrical CX-10463/GRC-142. | 1 | 180 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-0393 | Cable Assembly, Radio Frequency CG-3384/U | 1 | 17 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-0248 | Cable Assembly, Radio Frequency CG-2568A/U | 1 | 66 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-0389 | Cable Assembly, Radio Frequency CG-2340A/U | 1 | 108 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-2539 | Lead Electrical CX-10618/G | 1 | 52 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-2540 | Cable Assembly, Special Purpose, Electrical CX-10532/G. | 1 | 55 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-2537 | Lead Electrical CX-10616/G | 1 | 50 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-2538 | Lead Electrical CX-10617/G | 1 | 4½ | | | | 1, 2, 3, 4, 5, 6 |
| 5995-935-2536 | Lead Electrical CX-10615/G | 1 | 132 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-089-7799 | Lead Electrical CX-10761/G | 1 | 72 | | | | 1, 2, 3, 4, 5, 6 |
| 5995-937-8463 | Cable Assembly, Special Purpose, Electrical CX-10519/G. | 1 | 72 | | | | 1, 2, 3, 4, 5, 6 |
| 5820-937-7690 | Power Supply PP-4763( )/GRC | 1 | 13½ | 14¾ | 19½ | 125 | 1, 2, 3, 4, 5, 6 |
| 5815-937-5973 | Remote Control Assembly C-7279/GRC-142 | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 5820-322-4881 | Box Telephone | 1 | | | | | |
| 5815-937-6113 | Switch Assembly SA-1650/GRC | 1 | | | | | 2, 3, 5, 6 |
| 5815-926-7377 | Interconnecting Box J-2728/GRC-142 | 2 | | | | | 1, 2, 3, 4, 5, 6 |
| 6110-089-7348 | Distribution Box Power J-2776/GRC-142 | 1 | | | | | 1, 4 |
| 2540-846-8484 | Ladder Vehicular Boarding MX-3543( )/G, assembly. | 1 | | | | | 1, 2, 3, 4, 5, 6 |
| 5995-089-4497 | Cable Assembly, Power, Electrical CX-10551/G | | 157 | | | | 1, 4 |
| | Cable Assembly RF (SC-C-446368) | 1 | 9 | | | | 4, 5, 6 |

| FSN | Item | Quantity | Height or length (in.) | Depth (in.) | Width (in.) | Weight (lb) | Code |
|---|---|---|---|---|---|---|---|
| 5995-752-1362 | RF Cable Assembly CG-692/U | 1 | 900 | | | | 4,5,6 |
| 5995-521-0309 | RF Cable Assembly CG-55C/U | 1 | 1800 | | | | 4,5,6 |
| | Adapter, RF Connector, UG-29B/U | 1 | | | | | 4,5,6 |
| 5970-405-8971 | Insulator, ¾ in. x 4 in. JAN Type NL422B66-024 | 12 | | | | | 4,5,6 |
| | Splice, Split-bolt Burndy KS-90, or equal. | 18 | | | | | 4,5,6 |
| | Wire, Copper Stranded, #14 SWG, Hard Tinned | | 6000 | | | | 4,5,6 |
| 5985-507-6261 | Mast AB, AB-155/U | 3 | | | | | 4,5,6 |
| 5820-078-4770 | Mast Base AB-652/GR | 1 | | | | | 4,5,6 |
| | Reel Cable RC-435/U | 1 | | | | | 4,5,6 |
| 5820-571-1828 | Clamp, Antenna | 1 | | | | | 4-5-6 |
| 5985-199-8831 | Mast Section MS-116A | 3 | | | | | 4,5,6 |
| 5985-115-7149 | Mast Section MS-117A | 1 | | | | | 4,5,6 |
| 5985-238-7474 | Mast Section MS-118A | 1 | 37 | | | | 4,5,6 |
| 5995-682-3315 | Cable Assembly, Power Electrical CX-4541/U | 1 | 37 | | | | 4,5,6 |
| 6105-512-9225 | Motor | | | | | | 2,3,5,6 |
| | **See note below on air conditioners. | | | | | | |
| | Blower Assembly SM-C-613248 | 1 | | | | | 2,3,5,6 |
| 5995-494-9602 | Cable Assembly, Special Purpose, Electrical CX-10523/G. | 1 | 78 | | | | 1,2,3,4,5,6 |
| 5995-453-9427 | Cable Assembly, Special Purposes, Electrical CX-10524/G. | 1 | 60 | | | | 2,3,5,6 |
| 5995-937-8844 | Cable Assembly, Special Purpose, Electrical CX-10524/G. | 1 | 92 | | | | 1,2,3,4,5,6 |
| 5995-453-9429 | Cable Assembly, Special Purpose, Electrical CX-10526/G. | 2 | 48 | | | | 2,3,5,6 |
| | Cable Assembly, Power Electrical CX-10530/G | 1 | 118 | | | | 1,2,3,4,5,6 |
| 5995-789-3622 | Cable Assembly, Special Purpose, Electrical CX-10531/G. | 1 | 53 | | | | 1,2,3,4,5,6 |
| | Cable Assembly, Power Electrical, CX-10532/G | 1 | 55 | | | | 1,2,3,4,5,6 |
| 5995-494-8261 | Cable Assembly, Radio Frequency CG-2568A/U | 1 | 78 | | | | 2,3,5,6 |
| 5995-089-4497 | Cable Assembly, Special Purpose Electrical Branched. | 1 | 170 | | | | 1,2,3,4,5,6 |
| 5995-144-0048 | Cable Assembly, Special Purpose, Electrical CX-11992/G. | 1 | 108 | | | | 2,3,5,6 |
| 5995-246-4478 | Cable Assembly, Special Purpose, Electrical CX-11992/G. | 1 | 60 | | | | 2,3,5,6 |
| 5995-246-4476 | Cable Assembly, Special Purpose Electrical CX-11994/G. | 1 | 68 | | | | 2,3,5,6 |
| 5995-935-5236 | Cable Assembly, Power, Electrical CX-10951/G | 1 | 600 | | | | 1,2,3,4,5,6 |
| | D.C. Entrance Box (SM-D-602952) | 1 | | | | | 1,4 |
| 5915-930-6576 | Dust Cover Assembly (SC-D-446049) | 2 | | | | | 1,2,3,4,5,6 |
| 5965-163-9947 | Handset H-33( )/PT | 2 | | | | | 1,2,3,4,5,6 |
| 5965-226-2915 | Headset Electrical H-227/PT | 1 | | | | | 1,2,3,4,5,6 |
| 5820-511-4319 | Interconnecting Box J-654/G | 1 | | | | | 1,2,3,4,5,6 |
| 5805-226-2935 | Key Assembly KY-116/U | 1 | | | | | 1,2,3,4,5,6 |
| 5995-985-8014 | Lead, Electrical CX-10171/U | 1 | | | | | 1,2,3,4,5,6 |
| 5995-935-2539 | Lead, Electrical CX-10618/G | 1 | 52 | | | | 1,2,3,4,5,6 |
| 5965-243-6420 | Loudspeaker LS-166 | 1,2 | | | | | 1,4 |
| | Microphone M-29 | 1 | | | | | 1,2,3,4,5,6 |
| 6110-228-8570 | Panel Power Distribution SB-3358 | 1 | | | | | 1,2,3,4,5,6 |
| | Power Signal Entrance Box (SM-C-613048) | 1 | | | | | 1,2,3 |
| | Power Terminal Assembly (SM-D-613267) | | | | | | 2,3,5,6 |
| 5815-937-6113 | Switch Assembly SA-1554/GRC-142 | 1 | | | | | |
| 5930-937-5352 | Switch Box SA-1555/GRC-142 | 1 | | | | | 1,4 |
| 5210-897-6077 | Tape, Measuring RF (SC-A-46858) | 1 | | | | | 1,4 |
| | Thermostat (SM-D-613001-1) | 1 | | | | | 1,2,3,4,5,6 |
| | Technical Manual TM 11-5815-334-12 | 2 | | | | | 1,2,3,4,5,6 |
| | | | | | | | 1,2,3,4,5,6 |

*Space heater authorized as needed for AN/ GRC-142, AN/ GRC-122 without air conditioners and for 142A, and 122A.
**Air conditioners are used with, but not a part of, AN/ GRC-142(*) or AN/ GRC-122(*).

## 1-7. Common Names

A list of nomenclature common name assignments for the components common to all radio teletypewriter sets covered in this manual is given below.

*a. Nomenclature Assignments for Items Common to all Models.*

| | |
|---|---|
| Antenna Group AN/GRA-50 | Doublet antenna |
| Interconnecting Box J-2738/GRC-142(2). | Dummy box |
| Loudspeaker, Dynamic LS-166/U. | Loudspeaker |
| Remote Control C-7279/GRC-142. | Remote box |
| Cable Assembly, Special Pupose, Electrical CX-10508/G (6 ft). | W2 |
| Cable Assembly, Special Purpose, Electrical CX-10509/G (12 ft, 3 in.). | W3 |
| Cable Assembly, Special Purpose, Electrical CX-10510/G (11 ft, 7 in.). | W4 |
| Cable Assembly, Special Purpose, Electrical CX-10511/G (5 ft, 11 in.). | W5 |
| Cable Assembly, Special Purpose, Electrical CX-10513/G (W7 is 9 ft, 6 in., W8 is 7 ft, 6 in.). | W7 and W8 |
| Cable Assembly, Special Purpose, Electrical CX-10514/G (W9 is 6 ft, 9 in., W10 is 9 ft). | W9 and W10 |
| Cable Assembly, Special Purpose, Electrical CX-10515/G (W11 is 6 ft, W12 is 7 ft). | W11 and W12 |
| Cable Assembly, Special Purpose, Electrical CX-10516/G (4 ft). | W31 |
| Cable Assembly, Special Purpose, Electrical CX-10517/G (4 ft). | W14 |
| Cable Assembly, Special Purpose, Electrical CX-10518/G (6 ft). | W15 |
| Cable Assembly, Power, Electrical CX-10528/G (6 ft, 8 in.). | W16 |
| Cable Assembly, Special Purpose, Electrical CX-10519/G (6 ft). | W17 |
| Cable Assembly, Special Purpose, Electrical CX-10520/G (4 ft). | W18 |
| Cable Assembly, Special Purpose, Electrical CX-10521/G (10 ft, 4 in.). | W19 |
| Cable Assembly, Power, Electrical CX-10529/G (2 ft). (AN/GRC-142 Serial Nos. 1 through 697 only). | W20 |
| Cable Assembly, Special Purpose, Electrical CX-10522/G (6 ft). | W21 |
| Cable Assembly, Power, Electrical CX-10530/G (9 ft, 10 in.). | W22 |
| Cable Assembly, Power, Electrical CX-10530/G (10 ft, 5 in.). | W23 |
| Cable Assembly, Power, Electrical CX-10531/G (4 ft, 5 in.). | W24 |

| *Nomenclature* | *Common name* |
|---|---|
| Cable Assembly, Special Purpose, Electrical CX-10523/G (W25 is 6 ft, W26 is 6 ft, 6 in.) | W25 and W26 |
| Lead Electrical CX-10614 (4 ft, 8 in.) | W27 |
| Cable Assembly, Special Purpose, Electrical CX-10527/G (W33 is 3 ft, 1 in., W34 is 3 ft, 4 in.) | W33 and W34 |
| Cable Assembly, Power, Electrical CX-10633/G (15 ft, 3 in.) | W35 |
| Cable Assembly, Power, Electrical CX-10534/G (16 ft, 8 in.) | W36 |
| Lead Electrical CX-10614/G (4 ft, 8 in.) | W37 |
| Cable Assembly, Radio Frequency CG-3366/U (1 ft, 6 in.) | None |
| Cable Assembly, Radio Frequency CG-2568/U (5 ft, 6 6 in.) | None |
| Cable Assembly, Special Purpose, Electrical CX 0523/G (9 ft, 4. in) | W43 |
| Lead Electrical CX-10618/G (4 ft, 4 in.) | W44 |
| Cable Assembly, Power Electrical CX-10532/G (4 ft, 7 in.) | W45 |
| Lead Electrical CX-10616/G (4 ft, 2 in.) | W46 |
| Lead Electrical CX-10617/G (0 ft, 4.5 in.) | W48 |

*b. Nomenclature Assignments and Common Names for Items Peculiar to AN/GRC-142 or AN/GRC-122.*

| *Nomenclature* | *Common name* |
|---|---|
| Panel, Power Distribution SB-3018/GRC-142 | Power panel |
| Cable Assembly, Power Electrical CX-10463/GRC-142 | Dc power cable |
| Cable Assembly, Special Purpose, Electrical CX-10507/G (4 ft, 5 in.) | W1 |
| Cable Assembly, Special Purpose, Electrical CX-10512/G (5 ft, 6 in.) | W6 |
| Cable assembly, special purpose, electrical branched CX-10551/G (14ft, 2in.) | W47 |
| Cable Assembly, Special Purpose Electrical CX-10524/G (W28 is 10 ft., W30 is 8 ft, 8 in.) | W28 and W30 |
| Cable Assembly, Special Purpose, Electrical CX-10526/G (3 ft) | W31 and W32 |
| Distribution Box J-2776/GRC | Distribution box |
| Shelter, Electrical Equipment S-318/G | Shelter |
| Switch Assembly SA-1554/GRC-142 | Control panel |
| Switch Box SA-1555/GRC-142 | Switch box |

*c. Nomenclature and Common Name Assignments for Items Peculiar to AN/GRC-142A, -142B and AN/GRC-122A, -122B.*

| *Nomenclature* | *Common name* |
|---|---|
| Cable Assembly, Special Purpose, Electrical CX-10507/G | W1 |
| Cable Assembly, Special Purpose, Electrical CX-10512/G | W6 |
| Cable Assembly, Special Purpose, Electrical CX-10424/G (W28 5 ft), (W30 is 8 ft, 8 in.) | W28 and W30 |
| Cable Assembly, Special Purpose, Electrical CX-10526/G (4 ft) | W31 and W32 |
| Cable Assembly, Power, Electrical CX-10951 (to external ac power source) | W50 (fig. 2-3) |
| Cable Assembly, Special Purpose, Electrical CX-11994/G (5 ft, 8 in.) | W58 |
| Cable Assembly, Special Purpose Electrical CX-11992/G (5 ft) | W68 |
| Cable Assembly, Special Purpose, Electrical CX-11992/G (9 ft) | W69 |
| Cable Assembly, Power Electrical CX-12330/G | Extension for Hunter heater |
| Panel, Power Distribution SB-3358/GRC | Power distribution panel |
| Switch Assembly SA-1650/GRC | Switch assembly |
| Shelter, Electrical Equipment S-318(*)/G (AN/GRC-142A or AN GRC-122A only) | Shelter |
| Shelter, Electrical Equipment S-250/G (AN/GRC-142B or AN/GRC-122B only) | Shelter |

## 1-8. Description of Radio Teletypewriter Sets

All radio teletypewriter sets covered in this manual are comprised of receiving and transmitting communications equipment housed in transportable shelters. The major components (para 1-9) and shelter components (para 1-10), unless otherwise indicated, are common to all models. Antenna equipment for the radio teletypewriter sets are described in paragraph 1-11; additional equipment required but not supplied is described in paragraph 1-12. System application is discussed in paragraph 1-13. Paragraph 1-14 describes the differences in models.

## 1-9. Description of Major Components

*a. Radio Teletypewriter Sets AN/GRC-142 and AN/GRC-122, Shelter, Electrical Equipment* S-318/G (figs. 1-12 and 1-14).

(1) All components of the AN/GRC-142 or the AN/GRC-122 are installed in or on the shelter. All equipment racks and mountings, alternating current (ac) power receptacles, and signal wiring required for mounting and operating the units of the AN/GRC-142 or the AN/GRC-122 are provided in the shelter. Storage areas and installed mounting fixtures are provided for running spares and accessory items. The shelter can be transported by helicopter or truck, is fully insulated and watertight (up to the water fording line). Fresh air is drawn through the louvered door and exhausted through a shrouded exhaust fan opening at the front or cab end of the shelter. Hot air from the AM-3349/GRC-106 radiofrequency (RF) power amplifier is also exhausted through the same opening.

(2) Direct current (dc) power is connected to a four-pin connector in the dc entrance box at the front of the shelter. This dc entrance box also contains 10 push-type connectors for termination of signal and control lines. Ac power enters at the rear of the shelter through a four-pin connector in the ac entrance box. A 5-gallon gasoline can and the air-conditioner[1] condenser are mounted on the outside rear wall of the shelter. An air intake port for the heater, a door chime, and a message slot are also contained in the shelter rear wall. Whip antenna mountings are provided at the front and rear of the shelter. Two connectors are provided for termination of the doublet antennas; one at the roadside and the other at the rear. (The rear connector is for the duplex antenna (used with AN/GRC-122 only), and will accommodate either the whip or doublet.) The heater exhaust port is in the roadside wall, and the air-conditioner drain is on the curbside wall. A chair with a safety belt, is fastened to the floor. The access door of each of the seven storage compartments in the shelter is marked to indicate the items stored therein. Each side of the shelter has four supports for the shade tarpaulin. A two-section door at the rear is for entrance to the shelter. The inner section of the door is used when the shelter is truck-mounted and the tailgate is up. A padlock and a combination lock[2] are provided for securing the shelter door. The shelter door also has a *viewer* or *peephole.*

*b. Radio Teletypewriter Set AN/GRC-142A and AN/GRC-122A, Shelter, Electrical Equipment, S-318/G* (figs. 1-13 and 1-15).

(1) All components of the AN/GRC-142A or the AN/GRC-122A are installed in or on the shelter. All equipment racks and mountings, dc and ac power receptacles, and signal wire required for mounting and operating units of the AN/GRC-142A or AN/GRC-122A are provided in the shelter. Storage areas and installed mounting fixtures are provided for running spares and accessory items. The shelter can be transported by helicopter or truck, is fully insulated and watertight (up to the water fording line). Fresh air is drawn in through the louvered door and exhausted through a shrouded exhaust fan opening at the front or cab end of the shelter.

(2) Cool air for the AN/GRC-106 radio set is drawn in through an intake vent located adjacent to the shelter exhaust and the hot air generated by the AN/GRC-106 is exhausted through an exhaust vent located on the roadside wall of the shelter. An exhaust vent (port with a rotating cover) for the shelter heater is also located on the shelter roadside wall. Cool air for the PP-4763(*)/RGC is drawn in through an intake vent located on the curbside wall of the shelter and hot air is exhausted through a vent located directly above the intake vent. The power/signal entrance box located at the cab end of the shelter has a four-pin connector (normal orientation for dc power input) and a four-pin connector (90° counterclockwise orientation for ac power input) located adjacent to the dc connector. Ten push-type connectors for termination of the signal and control lines are located directly above the power input connectors.

[1,2] Supplied with AN/GRC-142, serial numbers 1 through 697 only.

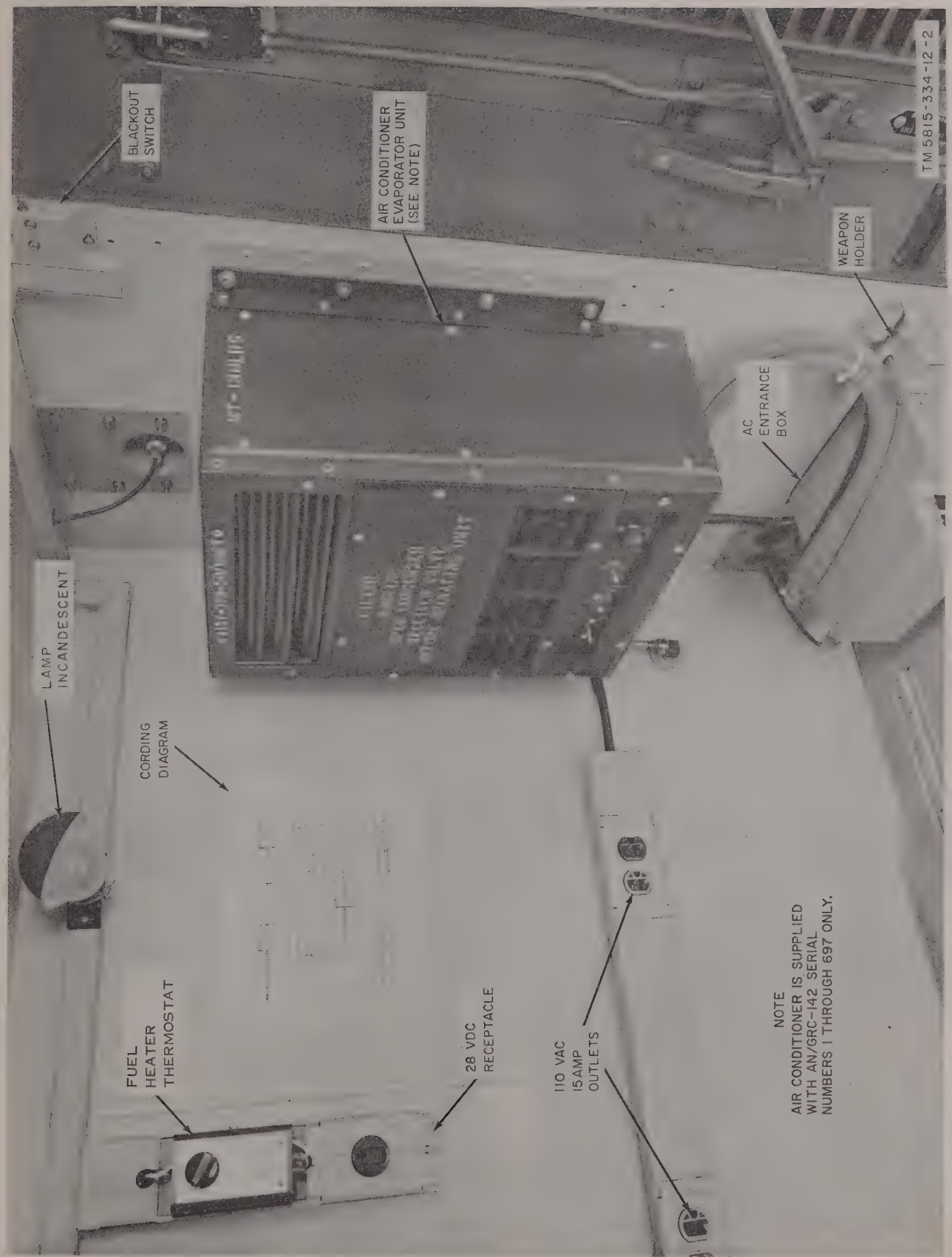



*Figure 1-3. Radio Teletypewriter Set AN/GRC-142 or AN/GRC-122, shelter interior, rear curbside corner.*

(3) A 5-gallon fuel can is mounted on the exterior rear wall of the shelter. The shelter heater air intake port is located beneath the shelter heater fuel can.

(4) Whip antenna mountings are provided at the front and rear of the shelter. Two connectors are provided for termination of the doublet antennas; one at the roadside and the other at the rear. The rear connector is for the duplex antenna (used with AN/GRC–122A only), and will accommodate either the whip or doublet. These duplex antennas are used in the AN/GRC–122(*) configurations only.

(5) A chair, equipped with a safety belt and a shoulder harness, is fastened to the shelter floor. On the interior roadside and curbside of the shelter are storage compartments. Below the access door of each storage compartment is a tabular listing of the items stored therein. Each side of the shelter has two supports for the shade tarpaulin. A two-section door at the rear is for entrance to the shelter. The inner section of the door is used when the shelter is truck-mounted and the tailgate is up. A padlock is provided for securing the shelter door. The shelter door also has a viewer or peephole.

*c. Radio Teletypewriter Sets AN/GRC–142 B and AN/GRC–122B, Shelter, Electrical Equipment S–250/G* (figs. 1–13, 1–16, and 1–17). The shelter for the AN/GRC–142B or AN/GRC–122B is similar to the shelter described in *b* above, except for size (para 1–5) and location of the shelter viewer or peephole. In this configuration, the viewer or peephole is located on the rear wall of the shelter between the shelter door and curbside wall.

*d. Radio Set AN/GRC–106.* The AN/GRC–106 (figs. 1–1 and 1–2) is a transceiver consisting of a receiver and low-level transmitter (RT–662/GRC) and a radiofrequency power amplifier (AM–3349/GRC–106). They are installed one on top of the other at the cab end of the shelter. An additional duplex RT–662/GRC is provided for the AN/GRC–122(*). A long crossbar is provided to permit the duplex RT–662-GRC to be mounted on top of the MD–522(*)/GRC. Each unit is self-contained in its own weatherproof case. All operating controls, meters, and connectors are front panel mounted. For a detailed description of the AN/GRC–106, refer to TM 11–5820–520–12.

*e. Radio Teletypewriter, Modem MD–522(*)/GRC.* During transmission, the MD–522(*)/GRC (figs. 1–1 and 1–2) converts dc pulses from the teletypewriter equipment to frequency-shifted audio tones (850 Hz fsk or 85 Hz nsk) that modulate the transmitter portion of the AN/GRC–106. During reception, it converts received teletypewriter tone signals from the AN/GRC–106 to dc pulses, which are applied to the teletypewriter equipment. In addition the MD–522(*)/GRC will apply voice signals, and voice plus 85-Hz (nsk) teletypewriter tones to the transmitter portion of the AN/GRC–106. It will also separate received voice and 85-Hz teletypewriter tones. It is contained in its own weatherproof case and mounted at the front of the shelter. All operating controls, meters, and connectors are on the front panel. A more detailed description of the MD–522A/GRC is contained in TM 11–5805–387–15–2. Radio teletypewriter Modem MD–522A/GRC is interchangeable with the MD–522/GRC. For a detailed description of the MD–522/GRC, refer to TM 11–5805–387–15–1. A short crossbar is used to mount the MD–522(*)/GRC in the AN/GRC–142(*). A long crossbar is used to mount the MD–522(*)/GRC and the duplex RT–662/GRC (stacked) in the AN/GRC–122(*).

*f. Control Group AN/GRA–6.* The AN/GRA–6 provides a means for controlling and operating the AN/GRC–106 from a remote site up to 1 mile away. In addition, the AN/GRA–6 makes provision for control of the AN/GRC–106 through a continuous circuit and for two-way telephone communication and ringing between the remote and local control operators. The local control portion consists of Local Control C–434/GRC (figs. 1–1 and 1–2) and the remote portion consists of Remote Control C–433/GRC (fig. 1–19). In addition to these basic components, the AN/GRA–6 includes Handset H–33/PT with a connector plug and a push-to-talk switch, and a carrying or storing container, Bag CW–189/GR. Connection between the local and remote control positions is provided by a pair of field wires connected to the dc entrance box. Both units are battery operated and are installed in individual weatherproof cases. All operating controls and indicators are front panel mounted. Local Control C–434/GRC is shelf-mounted at the cab end of the shelter (figs. 1–1 and 1–2) and is semipermanently wired into the shelter. Remote Control C–433/GRC and associated accessory items are stored in the shelter. Refer to TM 11–5038 for a more detailed description of the AN/GRA–6.

*g. Teletypewriter Reporforator-Transmitter TT–76A/GGC.* The TT–76A/GGC (figs. 1–1 and 1–2) permits transmission by either the manual


*Figure 1–4. Shelter interior, rear curbside corner (typical of AN/GRC–122A, or –122B configurations).*

operation of the keyboard or from punched tape. Messages received by the TT–76A/GGC, in standard Baudot code are printed and punched on paper tape which may be used for later transmission. Tapes may be prepared locally without disturbing the connected signal circuits. Operational speed may be 60 or 100 words per minute (wpm), as required, through the use of the appropriate drive gearset supplied with the unit. The TT–76A/GGC is located near the shelter roadside wall and is slide mounted in the AN/GRC–142 or AN/GRC–122 configuration. A chad bin is located under the perforator chute. A more detailed description of the TT–76A/GGC is contained in TM 11–5815–238–12.

*h. Teletypewriter TT–98/FG and Duplex Teletypewriter TT–98/FG.* The TT–98/FG (figs. 1–1 and 1–2) provides facilities for transmitting

monitoring, or receiving teletypewriter messages in Baudot code. Messages are printed as page copy. This unit is provided with a drive gear set for operational use at either 60 or 100 wpm. It is at the cab end of the shelter and is slide mounted in the AN/GRC–142 and AN/GRC–122 configurations. The duplex TT–98/FG (figs. 1–10 and 1–11) is contained in the AN/GRC–122(*) only and is shelf-mounted on the curbside wall. For a more detailed description of the TT–98/FG, refer to TM 11–5815–200–12.

*i. Telephone Set TA–312–PT.* The TA–312/PT (figs. 1–1 and 1–2) consists of a panel and housing assembly and a handset and cord assembly. A hand-operated ringing generator is mounted in the housing. Other operator controls are on the front panel. The TA–312/PT handset (H–60/PT) consists of a transmitter, receiver, and a push-to-talk switch all mounted in a plastic handle. The TA–312/PT is used for telephone communication from the shelter. It is mounted near the front of the shelter close to the floor. An extra TA–312/PT (for remote use) is stored in the compartment underneath the TT–76A/GGC. Refer to TM 11–5805–201–12 for a more detailed description of TA–312/PT.

*j. Remote Box.* The remote box (fig. 1–19) is used as a termination device for the remote teletypewriters. In addition, it provides a means for keying the AN/GRC–106 during teletypewriter modes of operation. It consists of a rectangular metal box with 12 teletypewriter jacks, 4 push-button connectors, 1 toggle switch, and 1 audio connector mounted on the top panel. It is used in conjunction with the remote control unit of the AN/GRA–6 and is stored in the shelter.

## 1–10. Description of Shelter Components

**NOTE**

Unless otherwise indicated, the items described are common to all shelter configurations covered in this manual.

*a. Air Conditioner (AN/GRC–142, Serial Numbers 1 Through 697 Only).* The air conditioner (fig. 1–3) is mounted on the shelter rear wall. It provides 6,000 British thermal units per hour (btu/hr) of cooling during hot weather operation, and 1,250 watts of heating during cold weather. For a detailed description of the air conditioner, refer to the maintenance manual packed with the equipment.

*b. Switch Assembly SA–1554/GRC–142 (AN/GRC–142 and AN/GRC–122 Only).* The SA–1554/GRC–142 (fig. 1–1) (control panel) is permanently installed at the cab end of the shelter. It provides facilities for switching between local and remote tty modes of operation and loop current adjustment. The TA–312/PT and AN/GRC–106 mike/keying circuits are routed through the SA–1554/GRC–142. It also interconnects the dummy boxes through front panel teletypewriter jacks. All controls and indicators are front panel mounted.

*c. Switch Assembly SA–1650/GRC (AN/GRC–142A, –142B and AN/GRC–122A, –122B Only).* The switch assembly (fig. 1–2) is permanently installed in the cab end of the shelter. It provides facilities for switching between local and remote tty modes of operation. When operating in the secure mode, a set low-level loop current is provided for the tty equipment. The switch assembly also permits switching the TT–76A/GGC between the owr and duplex circuits (used in the AN/GRC–122A, –122B only). Interconnections between the dummy boxes are provided by frontpanel teletypewriter jacks. The TA–312/PT and AN/GRC–106 mike/keying circuits are routed through the SA–1650/GRC. All controls and indicators are front panel mounted.

*d. Dummy Box.* Both dummy boxes (J–2728/GRC–142) are used as teletypewriter junction boxes during normal operation of the AN/GRC–142(*) or AN/GRC–122(*). They are removed and replaced by security equipment when secure messages are to be sent. The dummy boxes are at the cab end of the shelter (figs. 1–1 and 1–2).

*e. Shelter Fuel Heater.* Two types of shelter heaters (figs. 1–5, 1–6, and 1–6.1) are used interchangeably in the AN/GRC–142(*) and AN/GRC–122(*). The heater is located in the interior rear roadside of the shelter. The heater will operate by using gasoline, kerosene, burner fuel, or jet fuel. A detailed description of the heater is contained in TM 5–4520–211–14 (Hupp) or TM 5–4520–236–14 (Hunter). Models not containing the air conditioner contain an additional electrical heater (Heater, Space, Electrical Ac, Electromode Model AAT15A FSN 4520–224–7909 or Valad Model P–15 FSN 4520–912–3502) for use during *ac only* operation. The Electromode heater is mounted on the shelf near the rear curbside corner of the shelter. The Valad heater is mounted on the floor near the cab end of the shelter.

*f. Headset H–227/U.* The H–227/U (fig. 1–19)

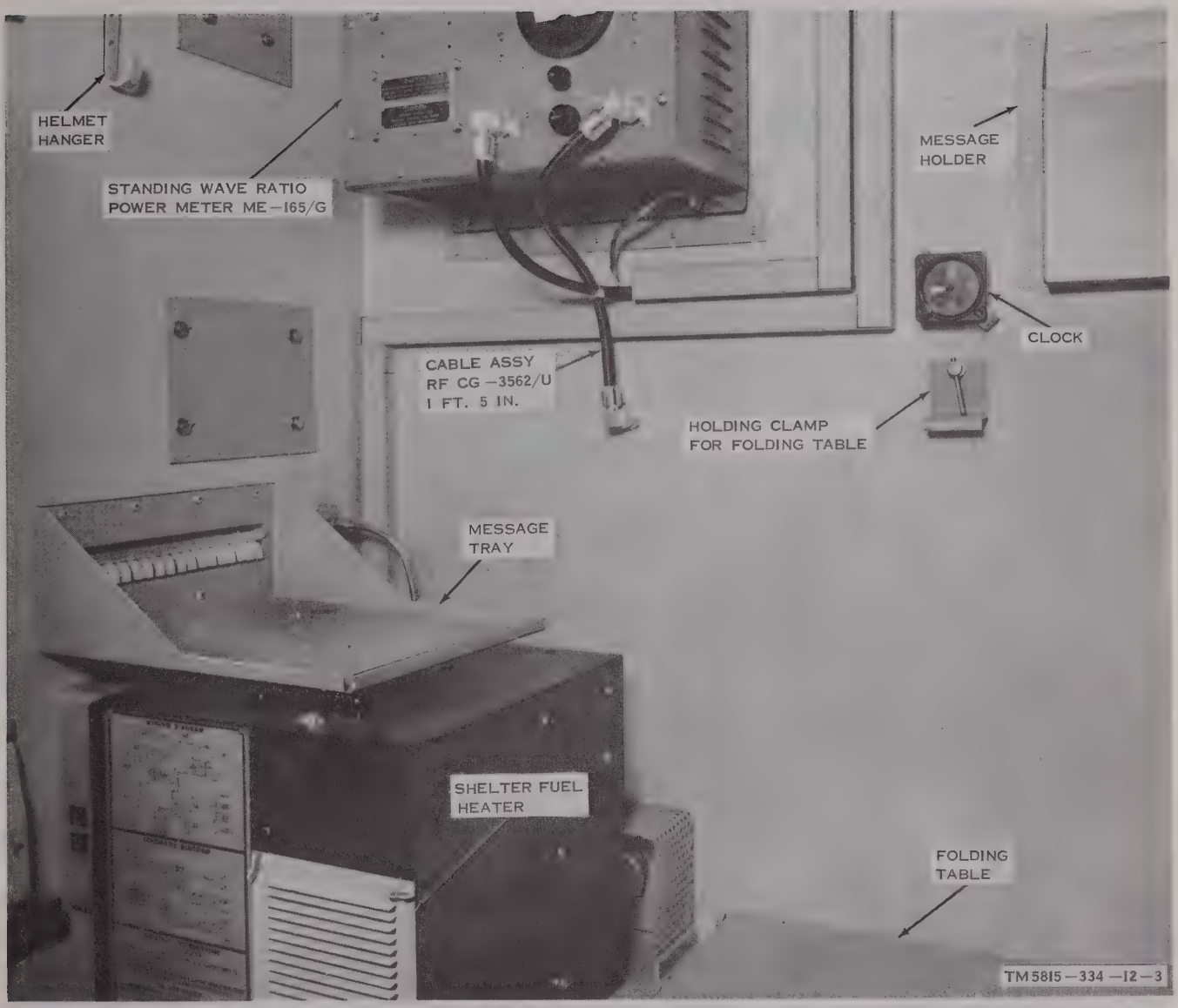



*Figure 1–5. Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122, shelter interior, rear roadside corner.*

consists of two 300-ohm earphones, each having a soft rubber earpiece. The headphones are mechanically interconnected by a thin metal headband, which is covered by a cushioning material and is adjustable to the contour of the operator's head. It is primarily used with the AN/GRC–106. An additional H–227/U is used with the duplex RT–662/GRC in the AN/GRC–122(*) configurations.

*g. Inverter, Motor-Generator (Nomenclatured PU–724/U).* The owr inverter (fig. 1–1 for the AN/GRC–142 and AN/GRC–122 and fig. 1–2 for the AN/GRC–142A, –142B and AN/GRC–122A, –122B) produces a 110-volt ac output from 28.5-volt dc input to provide power for the TT–76A/GGC and TT–98/FG. The duplex inverter, which is used in the AN/GRC–122(*) configurations, is located in front of the owr inverter in the AN/GRC–122 (fig. 1–10). The duplex inverter performs the same function for the duplex TT–98/FG in the AN/GRC–122A, –122B and is located near the curbside, cab end wall of the shelter (fig. 1–11). The inverters are *not* used during ac only operation.

*h. Key, Telegraph KY–116/U.* The KY–116/U (fig. 1–19) is a cw hand-keying device that has an adjustable metal band that can be clamped to the operator's leg. It has four brass screws for

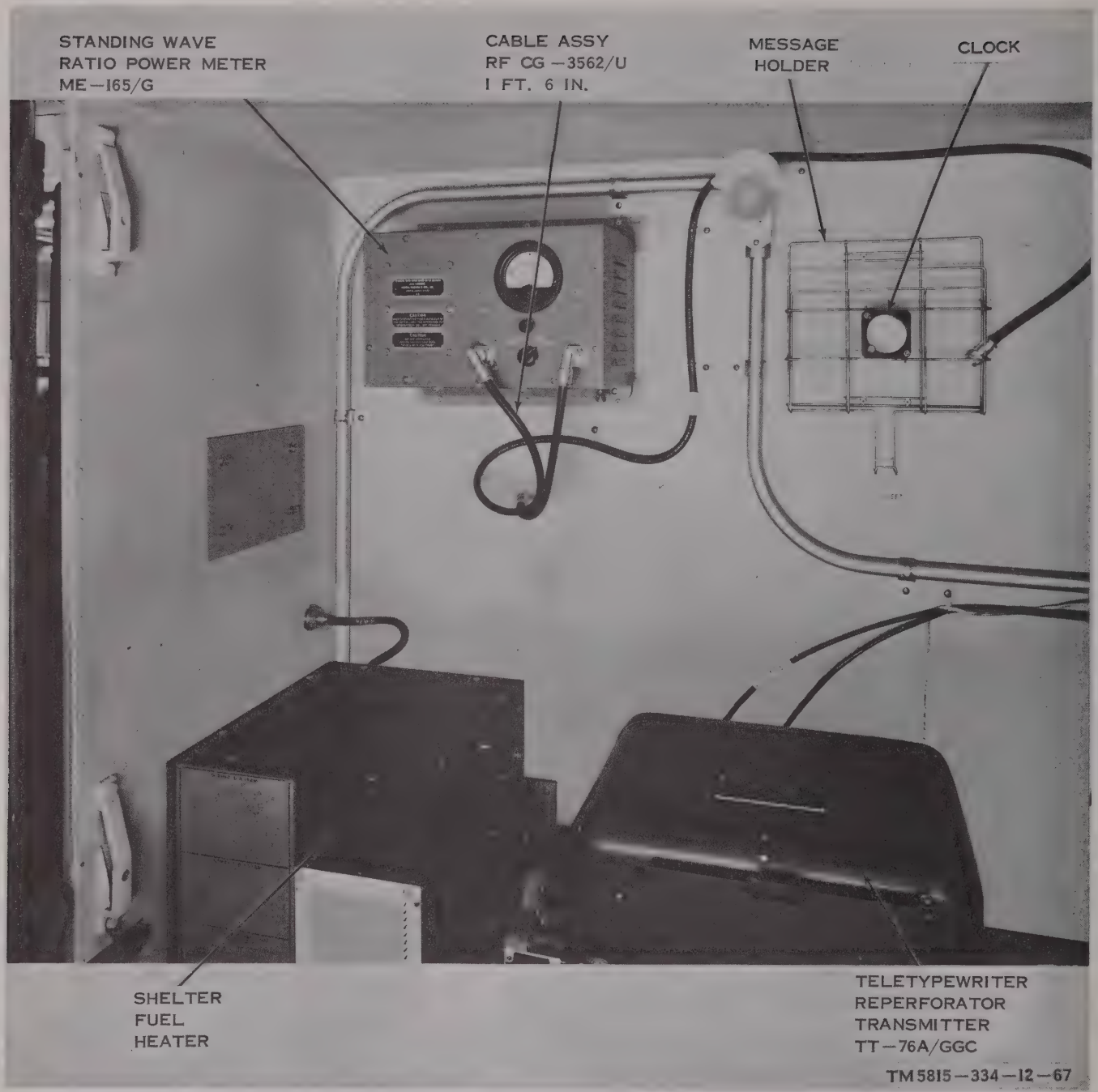



*Figure 1–6. Shelter, rear roadside corner (typical of AN/GRC–142A, –142B or AN/GRC–122A, –122B with Hupp heater).*

mechanical adjustments and two brass screws for connection through Special Purpose Electrical Cable Assembly CS–1852/U. The key is used with the AN/GRC–106 and is stored in a compartment underneath the heater.

*i. Low-Level Signaling Device TT–523/GGC.* The TT–523/GGC (fig. 3–5) is used with the TT–76A/GGC to make off-line tapes under secure conditions. The TT–523/GGC contains one toggle switch and is mounted at the rear of the TT–76A/GGC. For a more complete description of the TT–523/GGC refer to TM 11–5815–388–15.

*j. Handset H–33/PT.* The H–33/PT (fig. 1–19) consists of a plastic case containing a 100-ohm carbon microphone element, a 300-ohm earphone, and a nonlocking push-to-talk switch. The retractable coil cord terminates in 10-pin Connector, Plug, Electrical U–77/U. It is primarily used


*Figure 1–6.1 Shelter, rear roadside corner (typical of AN/GRC–142A, –142B, or AN/GRC–122A, –122B with Hunter heater model UH–48–B).*

with the AN/GRC–106, and is stored in a compartment underneath the heater.

*k. Microphone M–29/U.* The M–29/U is a unidirectional, low-impedance (100-ohm), carbon-element, hand-held microphone. It is inclosed in a plastic case which also contains a push-to-talk switch and has a three-wire, retractable cord (5 feet long) terminating in 10-pin Connector, Plug, Electrical U–77/U. It is used with the AN/GRC–106 and is hung on one of the frame supports. When not in use, it is stored in the compartment underneath the heater.

*l. Panel, Power Distribution SB–3018/GRC–142 (AN/GRC–142 and AN/GRC–122).* The

power panel (fig. 1–1) is permanently installed at the cab end of the shelter. It controls all dc power within the shelter. All controls and indicators are mounted on the front panel.

*m. Panel, Power Distribution SB–3358/GRC (AN/GRC–142A, –142B and AN/GRC–122A, –122B).* The power distribution panel (fig. 1–2) is permanently installed at the cab end of the shelter. It controls all ac and dc power within the shelter. All controls and indicators are mounted on the front panel.

*n. Loudspeaker, Dynamic LS–166/U and Duplex Loudspeaker, Dynamic (AN/GRC–122(*)).* The LS–166/U (figs. 1–1 and 1–2) consists of a permanent magnet dynamic speaker, a matching transformer, and a two-position output level switch housed in a metal case with a connecting cord. The cord is 5 feet long and terminates in 10-pin Connector, Plug, Electrical U–77/U. An additional LS–166/U (duplex) is provided in the AN/GRC–122(*) configurations for monitoring purposes (figs. 1–10 and 1–11).

*o. Clock.* An 8-day, luminous dial, 24-hour clock is mounted on the roadside wall (figs. 1–5 and 1–6). A knob on the left-hand side of the clock is used for winding and setting it.

*p. Switch Box SA–1555/GRC–142 (AN/GRC–142 and AN/GRC–122).* The switchbox (fig. 1–1) provides a means of obtaining low-level teletypewriter loop current when operating in the secure mode. The switchbox also permits switching the TT–76A/GGC between the owr and duplex circuits (used in AN/GRC–122 only). It is permanently installed near the cab end of the shelter and all controls are mounted on the front panel.

*q. Standing Wave Ratio—Power Meter ME–165/G.* The ME–165/G (figs. 1–5 and 1–6) is

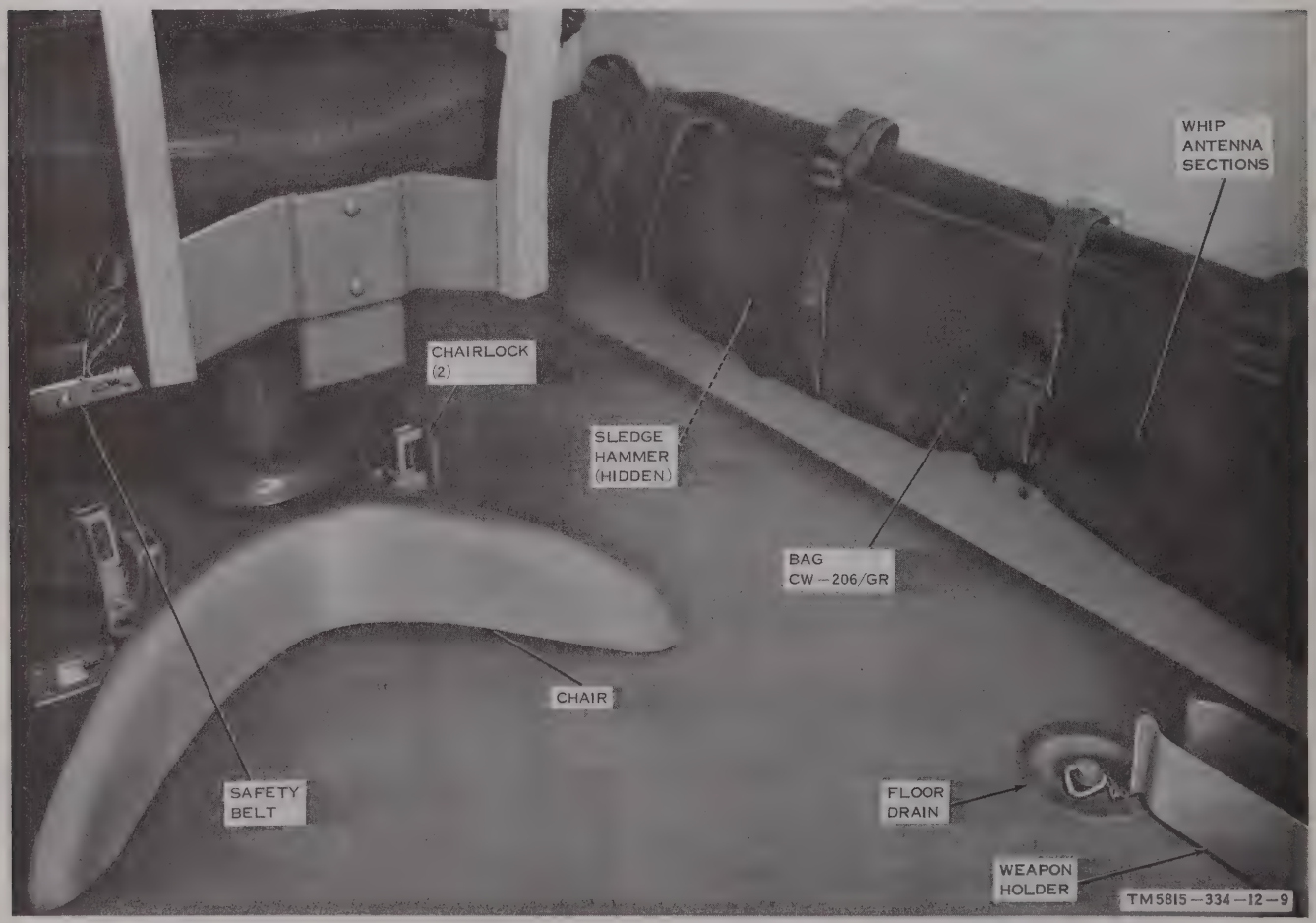



*Figure 1–7. Shelter interior, floor (typical of AN/GRC–142(*) or AN/GRC–122(*)).*

used for measuring transmitter (AM–3349/GRC–106) output power and standing-wave ratio when the doublet antenna is used. The ME–165/G may also be used for terminating the AM–3349/GRC–106 during radio silence operation.

*r. Distribution Box J–2776/GRC–142 (AN/GRC–142 and AN/GRC–122).* The distribution box (fig. 1–1) is near the cab end of the shelter beneath the TT–98/FG. It contains two ganged switches and four ac outlets (two outlets mounted on each side of this unit). This distribution box provides switching and power distribution for shelter operation from various power source combinations.

*s. Power Supply, Dc PP–4763(*)/GRC.* The PP–4763(*)/GRC provides 28.5 volts dc at 50 amperes to the shelter when an external 110-volt ac, 60-Hz power source is used to power the major components of the AN/GRC–142(*) or AN/GRC–122(*). The PP–4763(*)/GRC is floor mounted in the AN/GRC–142 and AN/GRC–122 near the cab end of the shelter beneath the center TT–98/FG. In the AN/GRC–142A, AN/GRC–142B, AN/GRC–122A, and AN/GRC–122B the PP–4763(*)/GRC is placed beneath the

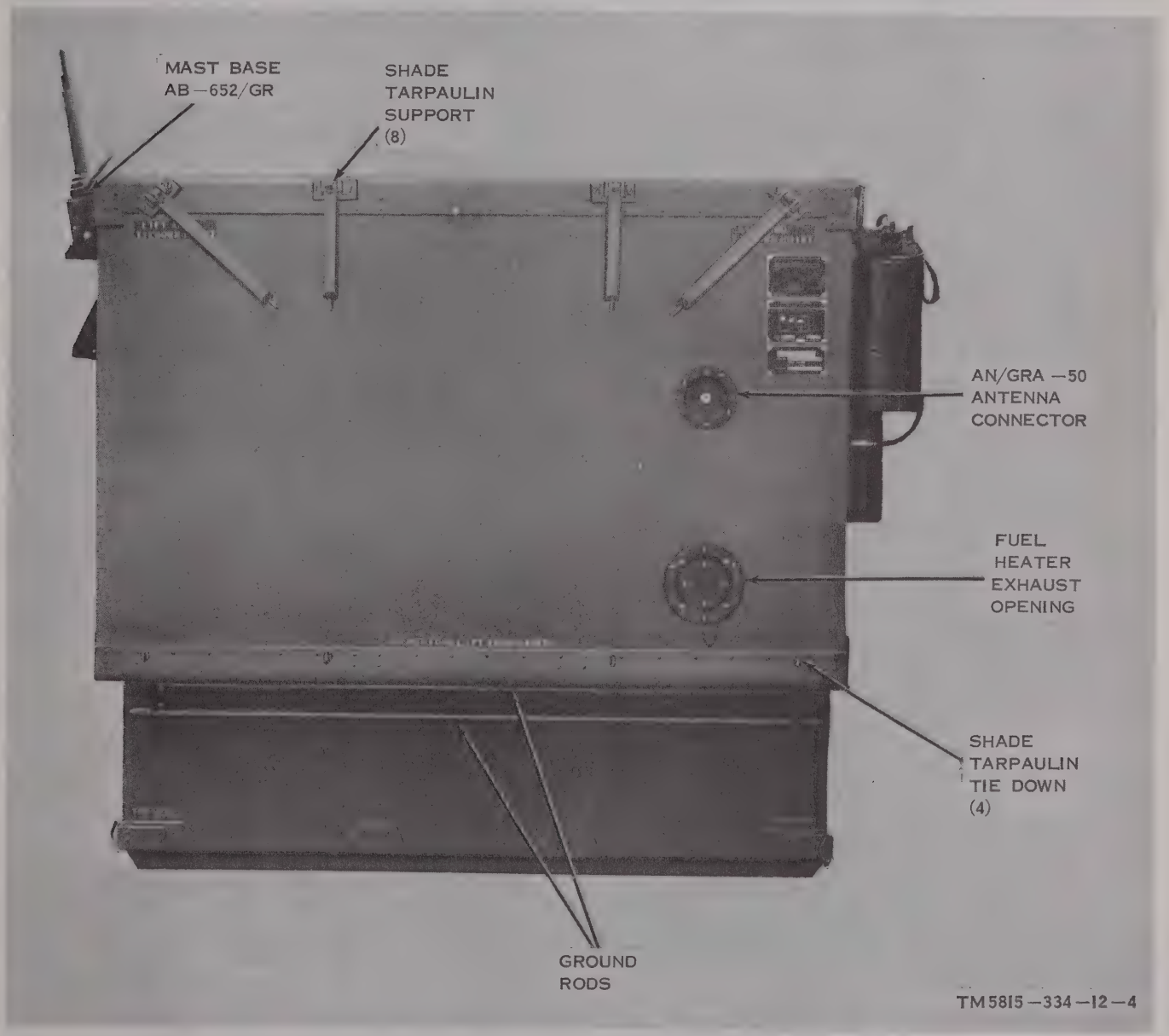



*Figure 1–8. Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122, shelter exterior, roadside wall.*

SB–3358/GRC on the right side of the cab end. For a detailed description of the PP–4763(*)/GRC refer to TM 11–5820–765–12.

*t. Ac Voltmeter (110 Volts Ac) (AN/GRC–142 and AN/GRC–122).* The ac voltmeter (fig. 1–22) is plugged into one of the ac convenience outlets to provide an ac power monitor during ac/dc only modes of shelter operation.

## 1–11. Description of Antenna Equipment

*a. Antenna Group AN/GRA–50.* The AN/GRA–50 is a doublet antenna and is used for transmission and reception of radio signals during fixed and mobile-at-halt operation of the AN/GRC–142(*) and AN/GRC–122(*). It is stored in the shelter and is used in place of the whip antenna (*b* below) for greater range and reliability. For a detailed description of the antenna, refer to TM 11–5820–467–15.

*b. Whip Antenna (15-Foot).* The whip antenna consists of three Mast Sections MS–116–A, one Mast Section MS–117–A, and one Mast Section MS–118–A mounted on mast Base AB–652/GR. In the AN/GRC–142(*) configurations, a mast base is mounted on the top front corner of the shelter (figs. 1–12 and 1–13), and a mast bracket is mounted on the top rear corner of the shelter (figs. 1–14 and 1–15). The AN/GRC–122(*) shelter has a mast base in both locations. During mobile operations or transport of the shelter, the

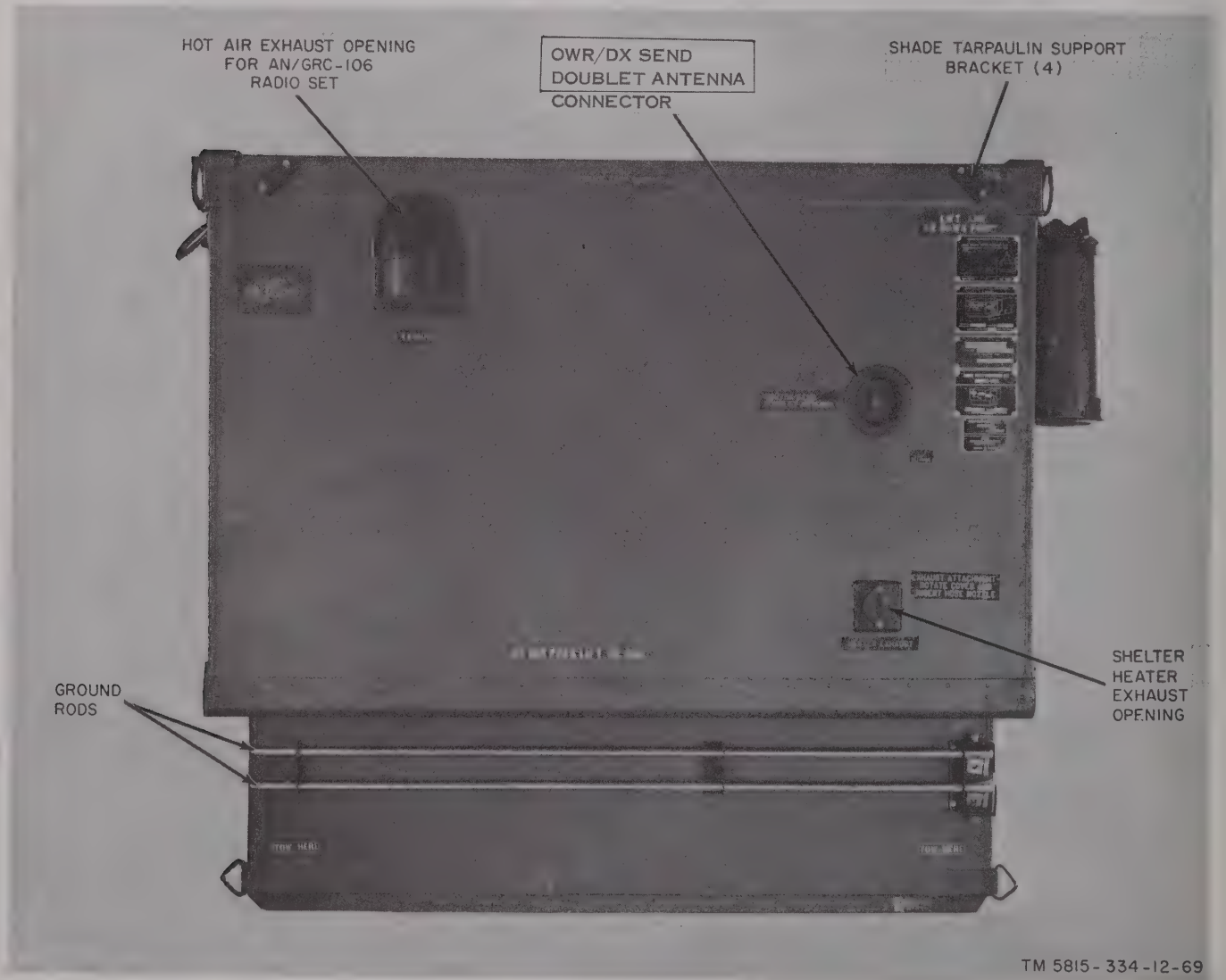



*Figure 1–9. Shelter exterior, roadside wall (AN/GRC–142A or AN/GRC–122A, serial numbers 1 through 118).*

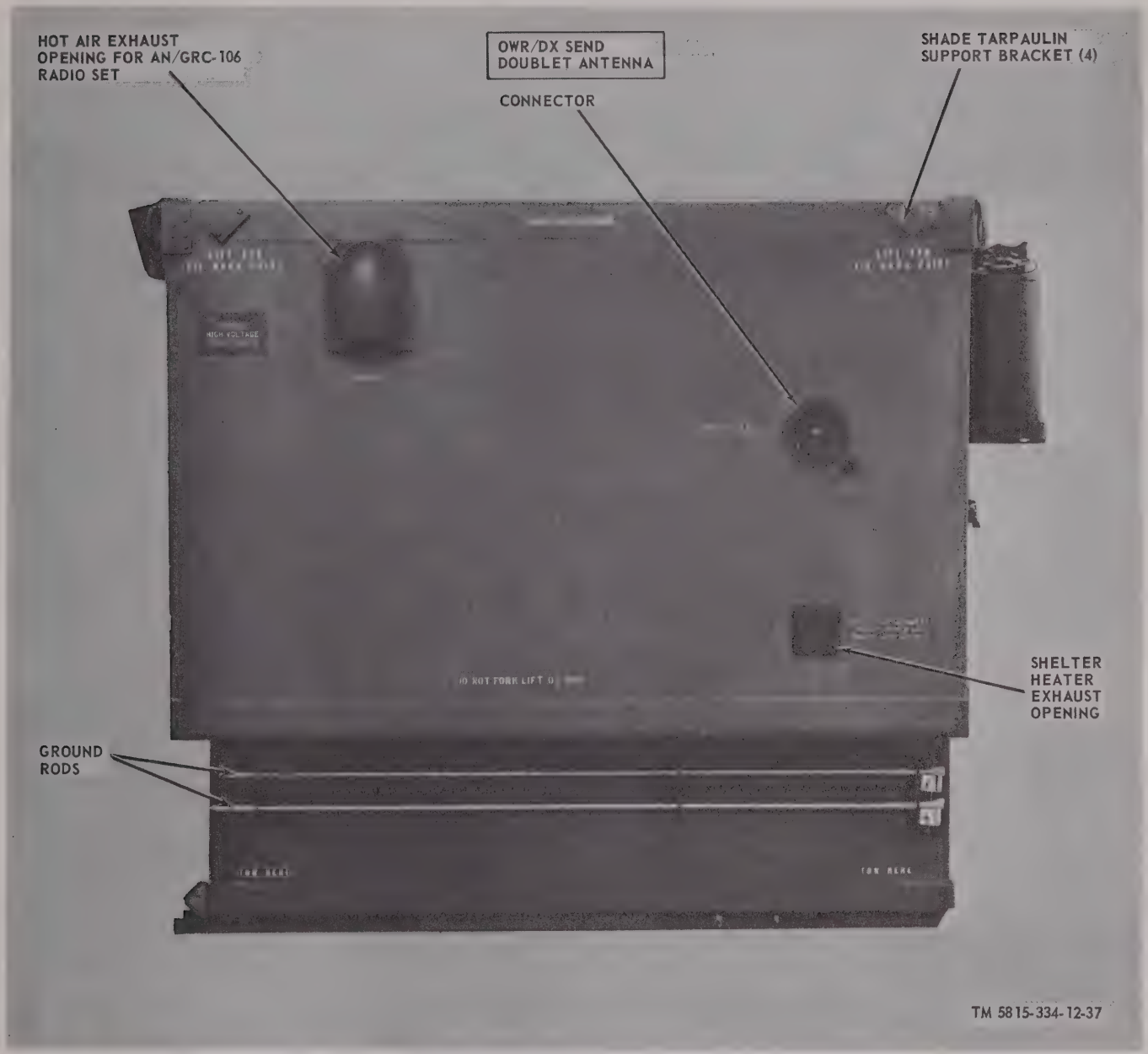



*Figure 1–9.1 Shelter exterior, roadside wall (typical of AN/GRC–142A, –142B, or AN/GRC–122A, –122B, serial numbers 119 and higher).*

whip antennas are kept tied in a horizontal position with insulated guy assemblies. Safety signal device (fig. 1–19) and whip tips are provided to reduce hazard to personnel when the whip antennas are tied down.

## 1–12. Additional Equipment Required

The following equipment is not supplied as part of Radio Teletypewriter Set AN/GRC–142(*) or AN/GRC–122(*) but is required for use with these sets.

*a. Dc Power Source.* A dc power source of 28.5 volts dc at 100 amperes is required for operation of the AN/GRC–142(*) or AN/GRC–122(*). This dc power source is either part of the vehicle on which these sets are installed or an external engine-driven dc generator.

*b. Ac Power Source.* An ac power source of 110 volts ac, 60 Hz, 60 amperes, single-phase is required for operation of the shelter air conditioner (supplied with AN/GRC–142, serial numbers 1 through 697 only) and ac outlets. This ac power source is either an external engine-driven ac generator or commercial ac power. When operating

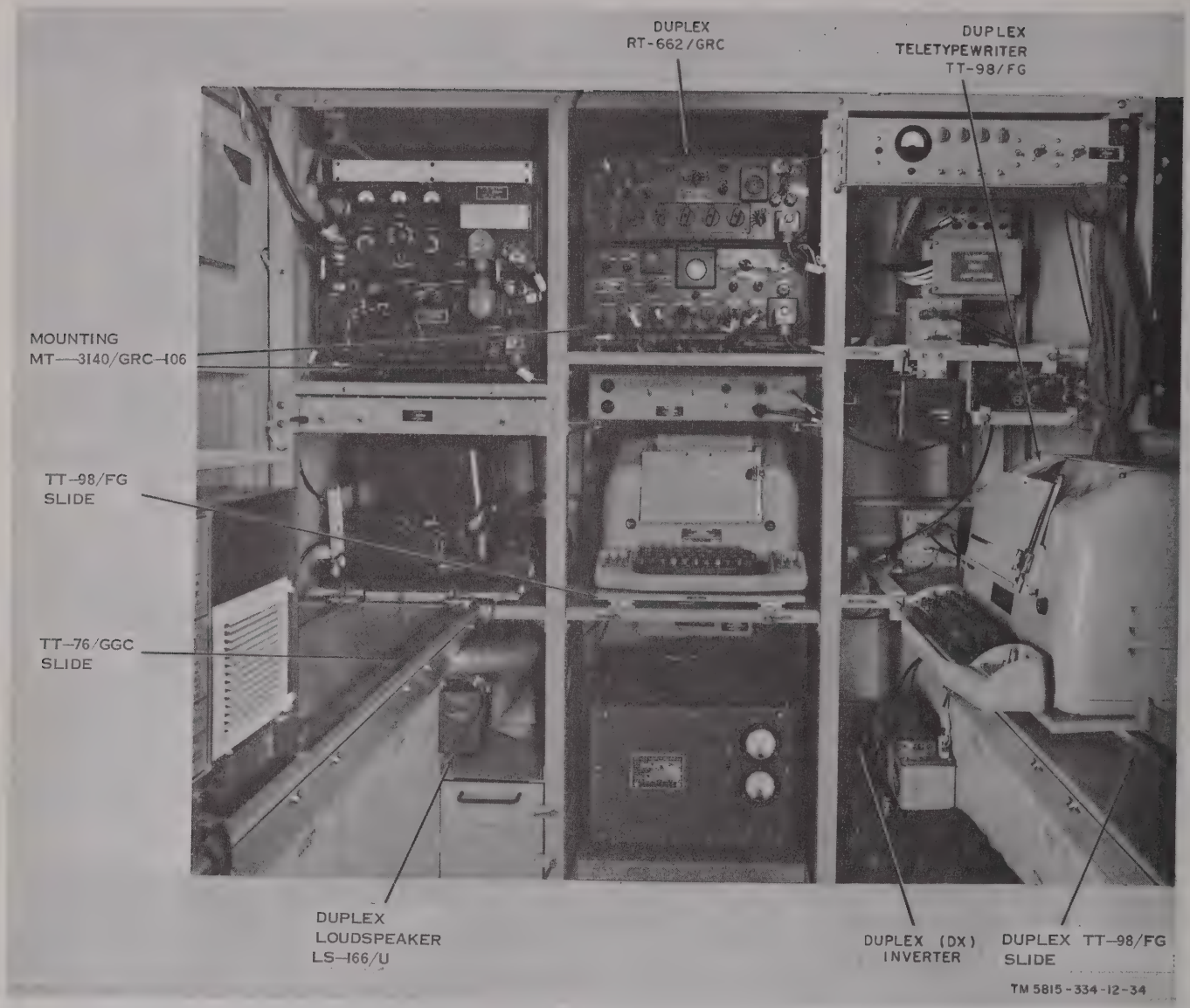



*Figure 1–10. Radio Teletypewriter Set AN/GRC–122, shelter interior, cab end, duplex equipment.*

in the ac only mode (no dc power applied to the shelter), an ac power source of 110 volts ac, 60 Hz, 1 phase, 75 amperes is required.

*c. Ac Power Cable.* Refer to paragraph 2–9*c* for construction details of the ac power cable for models that do contain this cable when delivered.

*d. Field Wire.* Field wire is required for remote operation. Sufficient field wire pairs for remote operation up to 1 mile from the shelter are required. Refer to paragraph 2–12 to determine the number of field wire pairs required for the type of remote operation desired.

*e. Security Equipment.* Provision is made in all models for the use of security equipment. This equipment is not supplied and must be requisitioned when required.

*f. Remote Teletypewriter Operation.*

(1) For one-way reversible (owr) operation, one extra TT–98/FG is required for printing page copy. If tape punched copy is required, one extra TT–76/GGC is required.

(2) For remote duplex operation, the equipment in (1) above plus an extra TT–98 FG is required.

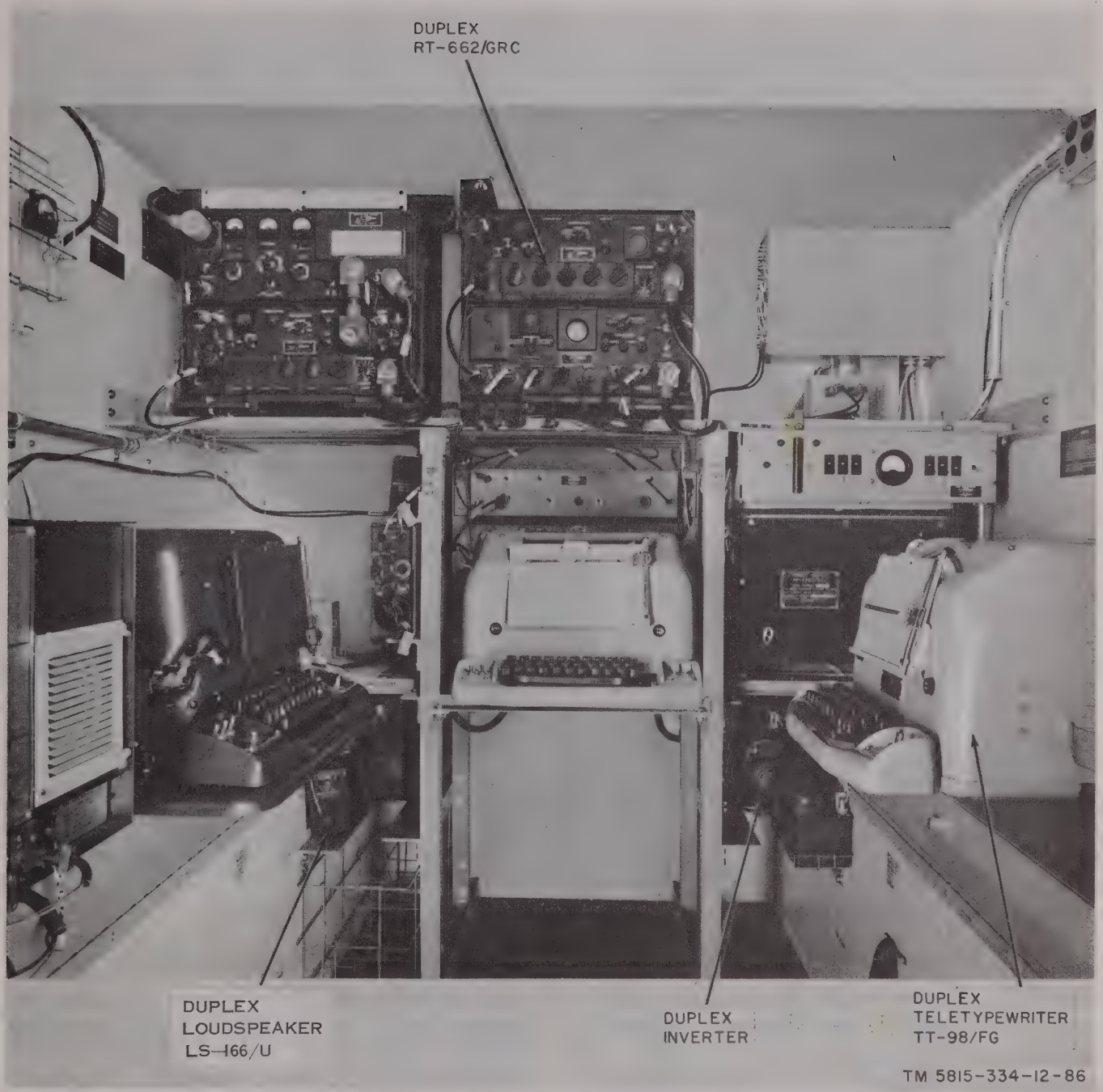



*Figure 1–11. Shelter interior, cab end, duplex equipment for AN/GRC–122A, and AN/GRC–122B.*

*g. Remote Ac Power Source.* For any type of remote tty operation, a source of 115-volt ac, 60-Hz power (2 amperes per tty equipment) is required at the remote site.

## 1–13. System Application

*a. General.* The AN/GRC–142(*) or AN/GRC–122(*) is capable of transmitting and receiving ssb, compatible am., and cw signals. Fsk, nsk, and nsk voice transmission and reception are also possible, using the teletypewriter equipment provided. A simplified system block diagram of the AN/GRC–142 or AN/GRC–122 is shown in figure 1–20 and a simplified system block diagram of the AN/GRC–142A, –142B or AN/GRC–122A, –122B is shown in figure 1–21.

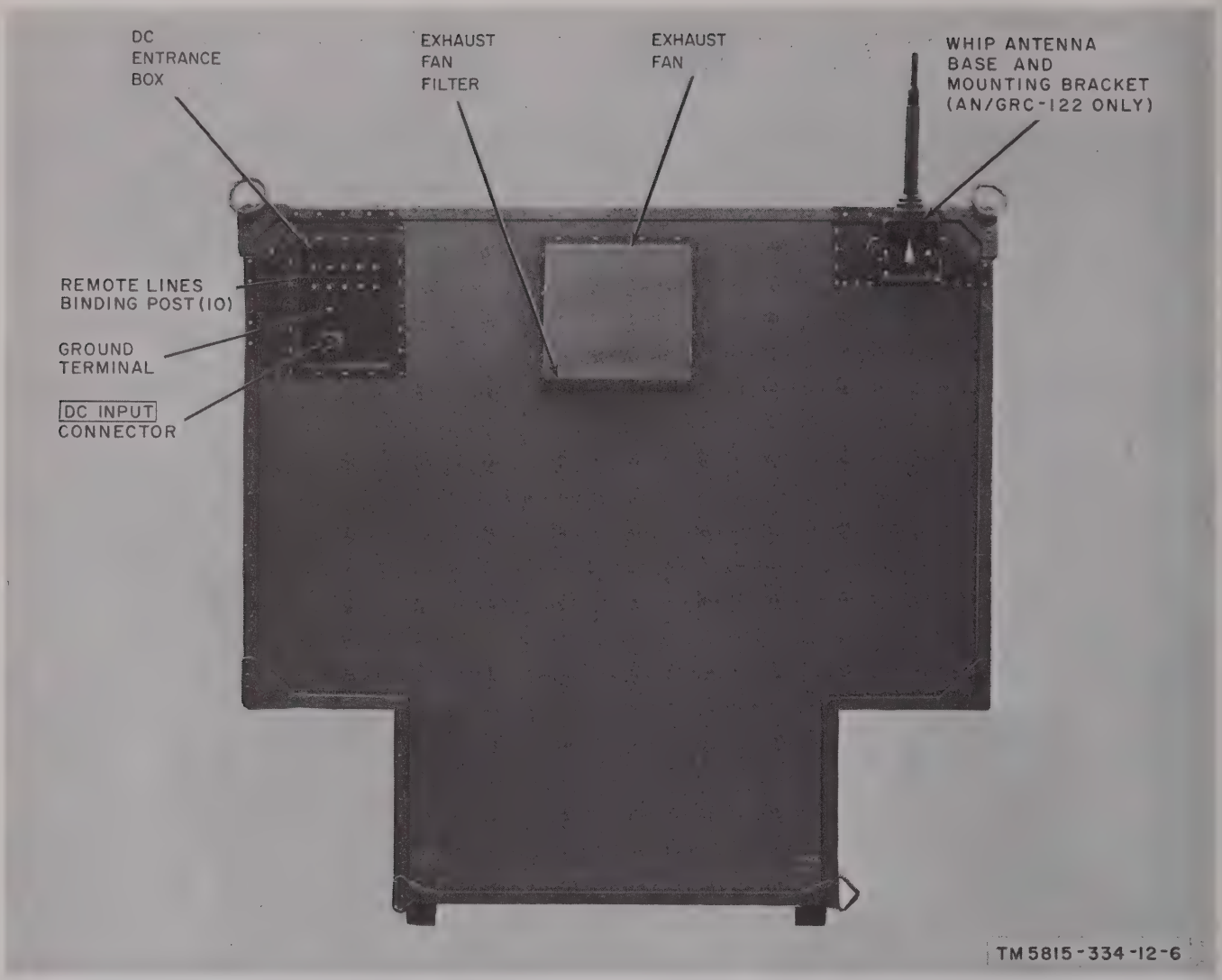



*Figure 1–12. Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122, shelter exterior, cab end wall.*

The types of operation of the AN/GRC–142(*) and AN/GRC–122(*) are given in *b* through *j* below.

*b. Local Owr Radio Teletypewriter Operation.* In the transmit link, a message is originated at the TT–76A/GGC or TT–98/FG. This message passes through the control panel (AN/GRC–142 or AN/GRC–122 or Switch Assembly SA–1650/GRC (AN/GRC–142A, –142B or AN/GRC–122A, –122B) to the MD–522(*)/GRC for conversion to fsk or nsk tones. These tones are used to modulate the AN/GRC–106. In the receive link, an RF fsk signal is received from a distant radio transmitter, demodulated by the AN/GRC–106 and applied to the MD–522(*)/GRC as fsk or nsk audio tones. The MD–522(*)/GRC converts the fsk audio tones to teletypewriter code in the form of dc marks and spaces, which are routed to the TT–98/FG through the control panel (AN/GRC–142 or AN/GRC–122) or Switch Assembly (AN/GRC–142A, –142B or AN/GRC–122A, –122B). In addition to the page copy printed by the TT–98/FG, a punched tape of the received message may be made on the TT–76A/GGC.

*c. Local Owr Voice Operation.* In the transmit path, voice signals developed in the M–29/U or H–33/PT are applied to the AN/GRC–106 through the control panel (AN/GRC–142 or AN/GRC–122) or Switch Assembly SA–1650/GRC (AN/GRC–142A, –142B or AN/GRC–122A, –122B) and the MD–522(*)/GRC. In the receive path, the radio signals are received and demodulated by the AN/GRC–106 and applied through

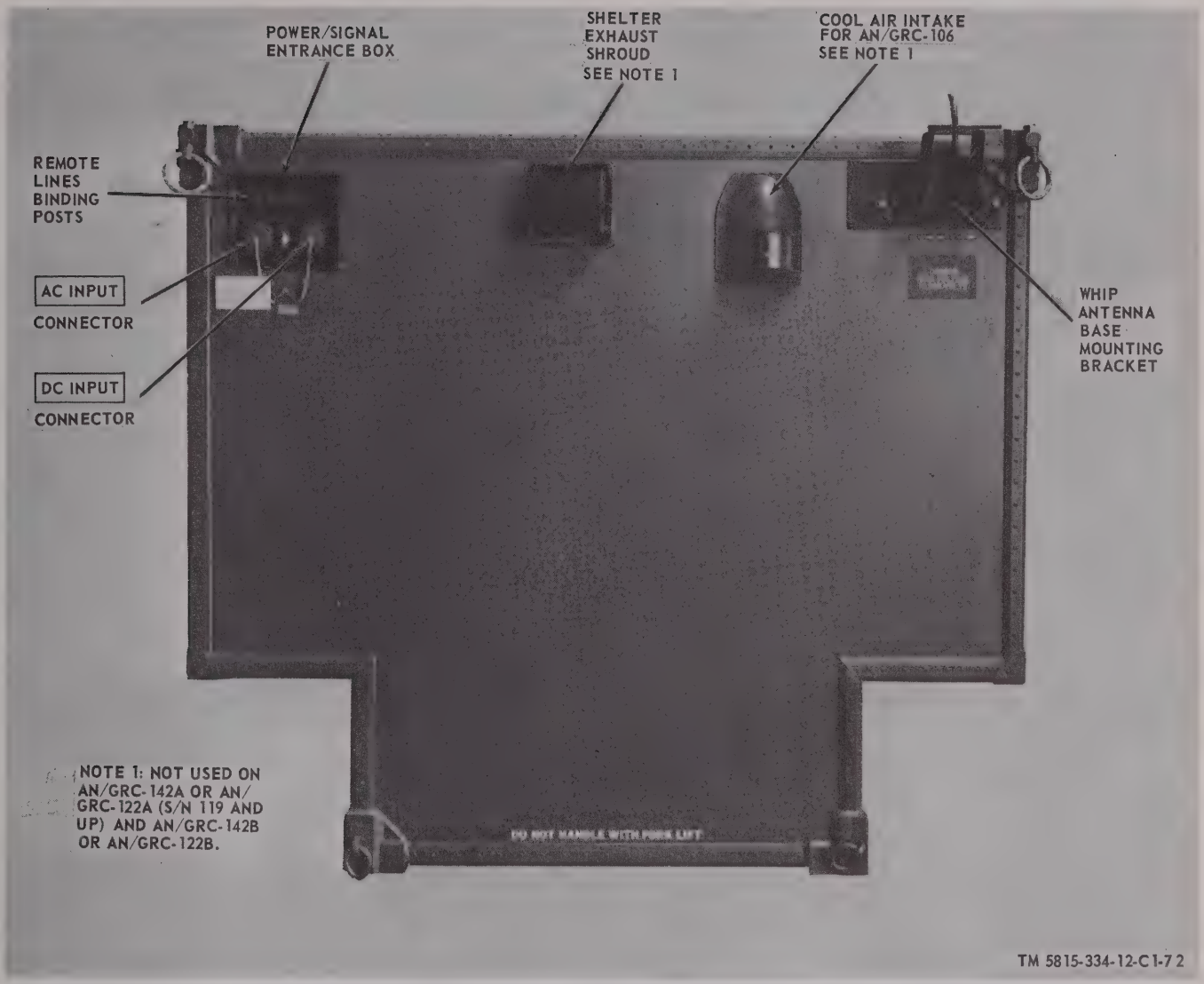



*Figure 1–13. Shelter exterior, cab end wall (typical of AN/GRC–142A, –142B or AN/GRC–122A, –122B).*

the MD–522(*)/GRC to the control panel (AN/GRC–142 or AN/GRC–122) or switch assembly (AN/GRC–142A, –142B or AN/GRC–122A, –122B). The received message can be heard on the H–33/PT, LS–166/U, or H–227/U.

*d. Local Owr Voice Plus Teletypewriter (Nsk) Operation.* Voice signals (originating at the M–29/U or H–33/PT) and teletypewriter signals (originating at the TT–76A/GGC or TT–98/FG) are simultaneously applied through the control panel (AN/GRC–142 or AN/GRC–122) or Switch Assembly SA–1650/GRC (AN/GRC–142A, –142B or AN/GRC–122A –122B) to the MD–522(*)/GRC. The MD–522(*)/GRC combines the two signals and applies the resultant signal to the AN/GRC–106 for transmission. During receive operation, the voice and nsk signals are received by the AN/GRC–106. They are separated by the MD–522(*)/GRC and routed to the H–33/PT (voice) and to the TT–98/FG and/or TT–76A/GGC (tty) through the control panel (AN/GRC–142 or AN/GRC–122) or switch assembly (AN/GRC–142A, –142B or AN/GRC–122A, –122B).

*e. Local Owr Cw Operation.* A cw transmit signal is developed by the KY–116/U and routed to the AN/GRC–106 through the control panel (AN/GRC–142 or AN/GRC–122) or Switch Assembly SA–1650/GRC (AN/GRC–142A, –142B or AN/GRC–122A, –122B) and MD–522(*)/GRC. Cw signals received by the AN/GRC–106 are routed to the MD–522(*)/GRC where they can be

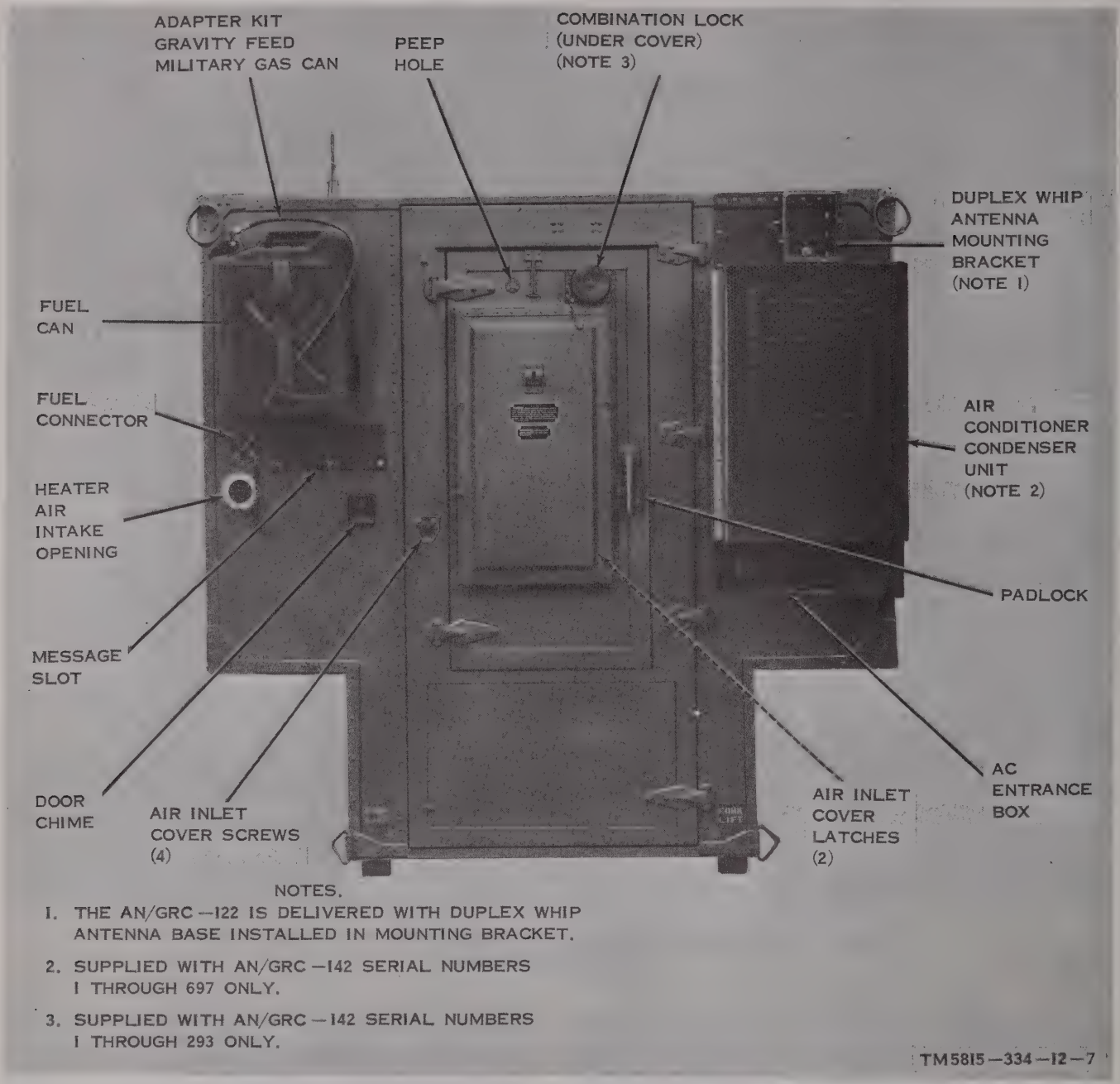



*Figure 1–14. Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122 shelter exterior, rear wall.*

heard on any of the receive audio accessories. The audio tone (sidetone) generated during cw transmission may also be heard on these audio accessories.

**NOTE**

In late models of the AN/GRC–142 and AN/GRC–122, the remote KY–116/U is connected to the dc entrance box SPARE (or REMCW) terminals and simultaneous remote cw and field telephone is possible.

*f. Remote Field Telephone/CW Operation.* A remote field telephone (TA–312/PT) allows the field operator at the remote site to talk with the local operator in the shelter. Connection between the two TA–312/PT's is by field wire.

(1) In the AN/GRC–142 or AN/GRC–122 (early models), (fig. 1–20), the remote TA–312/PT may be disconnected and a KY–116/U connected in its place. This arrangement permits cw transmission to originate at the remote site. The cw transmit signal is applied to the AN/GRC–106

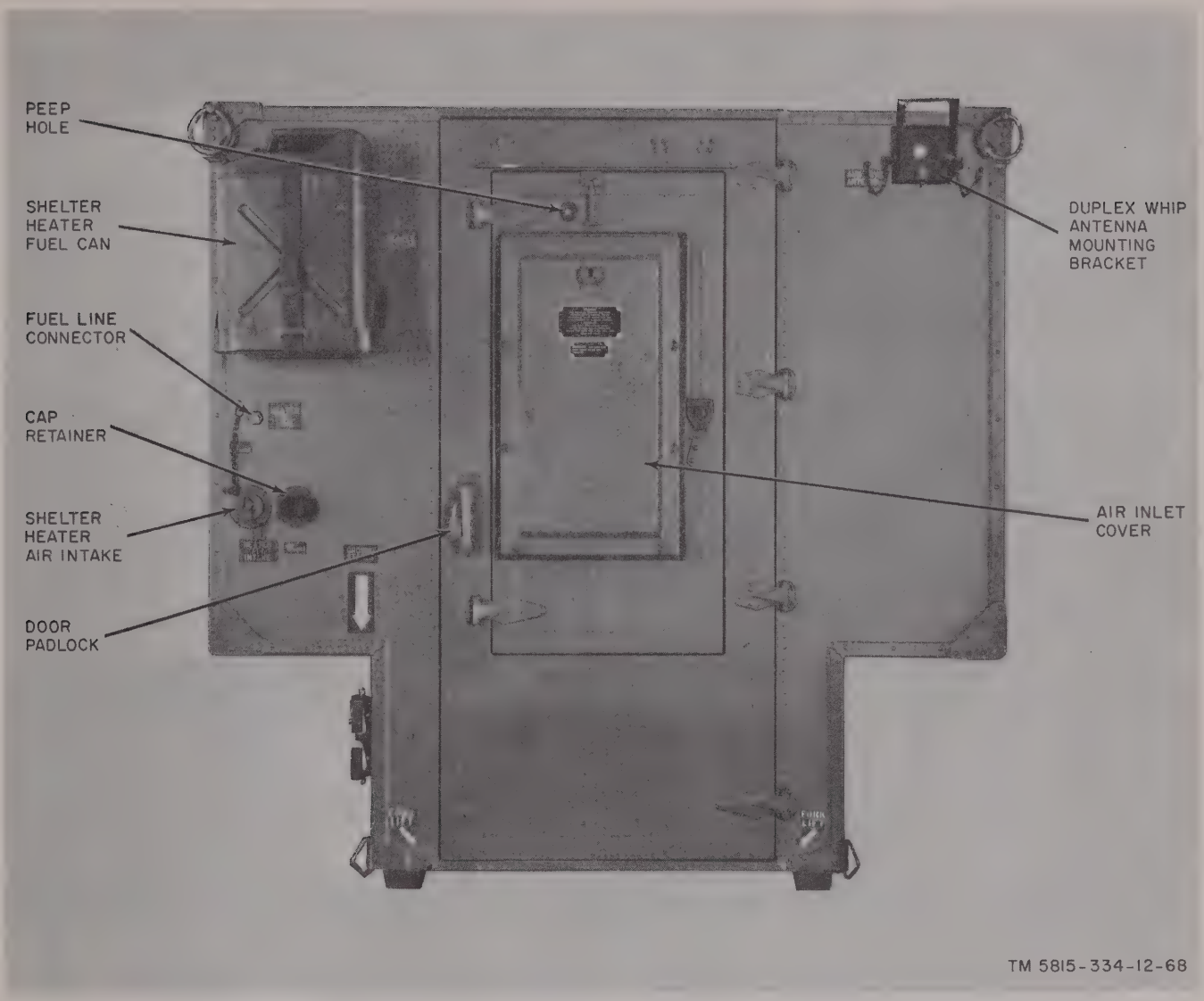



*Figure 1–15. Radio Teletypewriter Set AN/GRC–142A or AN/GRC–122A shelter S–318/G exterior, rear wall (serial numbers 1 through 118).*

through the landlines, control panel, and MD–522(*)/GRC. When operating in the remote cw mode, the AN/GRA–6 is used for telephone communication between the shelter and remote site and for receiving cw at the remote site.

(2) In the AN/GRC–142A, –142B or AN/GRC–122A, –122B (fig. 1–21), a separate pair of field wires is connected to the REM CW terminals on the POWER/SIGNAL ENTRANCE BOX and a plug-in connector inside the shelter is mated to the VOICE–KEY connector on the switch assembly when keying from a remote site.

(3) When operating in the remote cw mode from the remote site, the TA–312/PT is used for telephone communications. Remote Control C–433(GRC (p/o AN/GRA–6)) is used at the remote site for receiving cw signals.

*g. Remote Owr Voice Operation.* The AN/GRA–6, in conjunction with the remote box, allows the AN/GRC–106 to be keyed and voice-modulated from a remote site. Reception of radio signals (received by the AN/GRC–106) is also provided at the remote site. When the H–33/PT is connected to the remote box, audio signals and push-to-talk control signals are applied to the C–433/GRC. These signals pass through the landlines, the C–434/GRC, the control panel (AN/GRC–142 or AN/GRC–122) or Switch Assembly SA–1650/GRC (AN/GRC–142A, –142B or AN/GRC–122A, –122B), and the MD–522(*)/

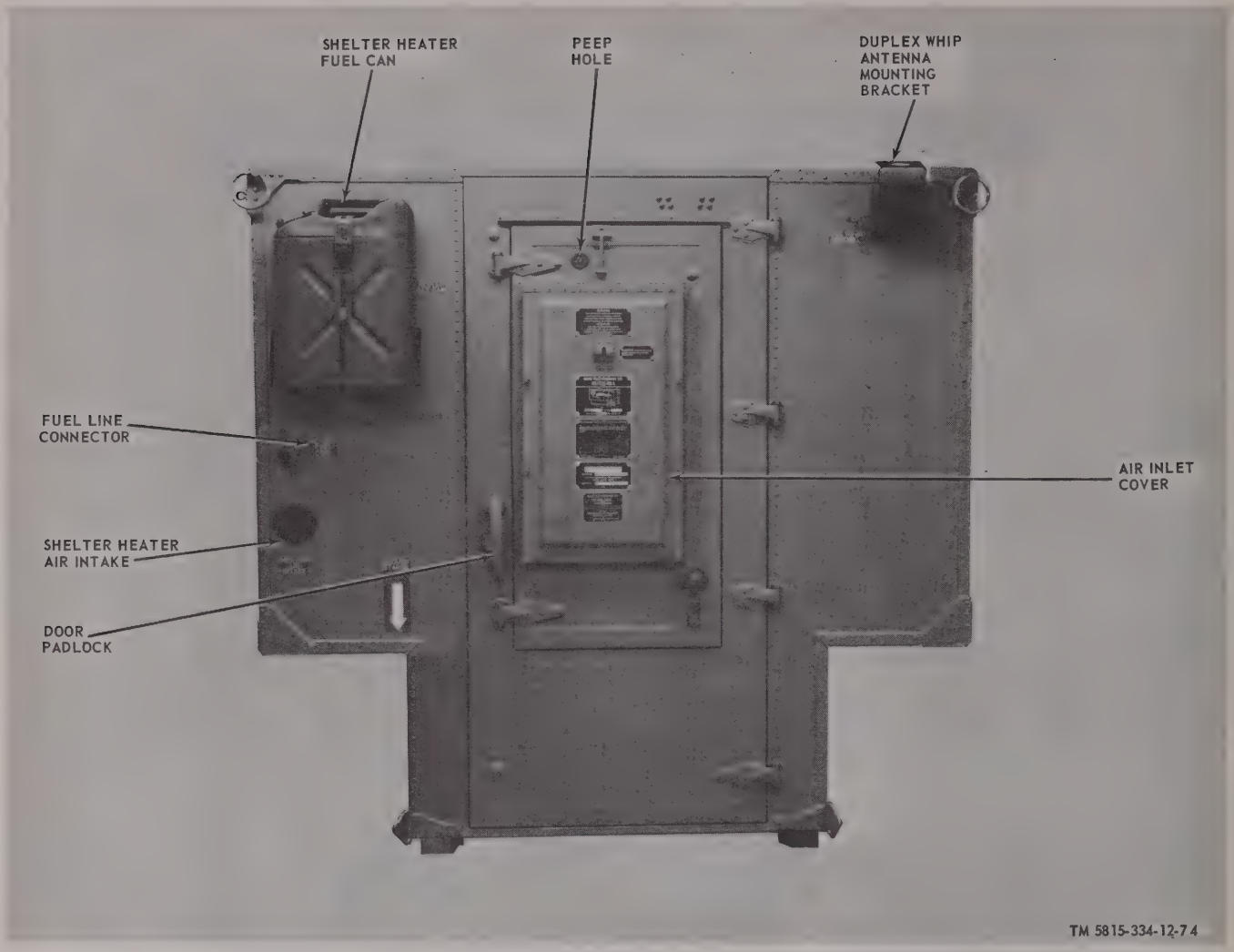



*Figure 1–15.1 Radio Teletypewriter Set AN/GRC–142A, or AN/GRC–122A shelter S–318/G exterior, rear wall, serial numbers 119 and higher.*

GRC to the AN/GRC–106. Signals received by the AN/GRC–106 are sent back to the remote site through the same route through the C–434/GRC, the landlines, and the C–433/GRC to the H–227/U or H–33/PT.

*h. Remote Owr Teletypewriter Operation.* Remote teletypewriter operation is provided by use of the remote box and AN/GRA–6. Teletypewriter signals generated at the remote site are applied to the remote box which, in turn, is connected by landlines through the shelter entrance box to the shelter teletypewriter equipment. These teletypewriter signals are then applied the same way as for local owr operation (*b* above) to the AN/GRC–106 for transmission to a distant station. Teletypewriter signals received by the AN/GRC–106 are sent back over the same route to the remote site. Keying of the AN/GRC–106 is accomplished through the AN/GRA–6 and remote box.

*i. Duplex Operation.* Duplex operation allows the simultaneous transmission and reception of teletypewriter and/or voice information. Duplex operation is possible only with the AN/GRC–122(*). Figure 1–20 shows the duplex units that are added to the AN/GRC–142(*) to obtain an AN/GRC–122(*). These additional units provide the local duplex capability. This duplex capability can be extended to the remote site with the addition of remote teletypewriter equipment. From an operational standpoint, the AN/GRC–122(*) is essentially divided into two links: a transmit link and a receive link. The transmit link consists mainly of the AN/GRC–106; the receive link consists mainly of the duplex RT–622/GRC. Each link operates in-

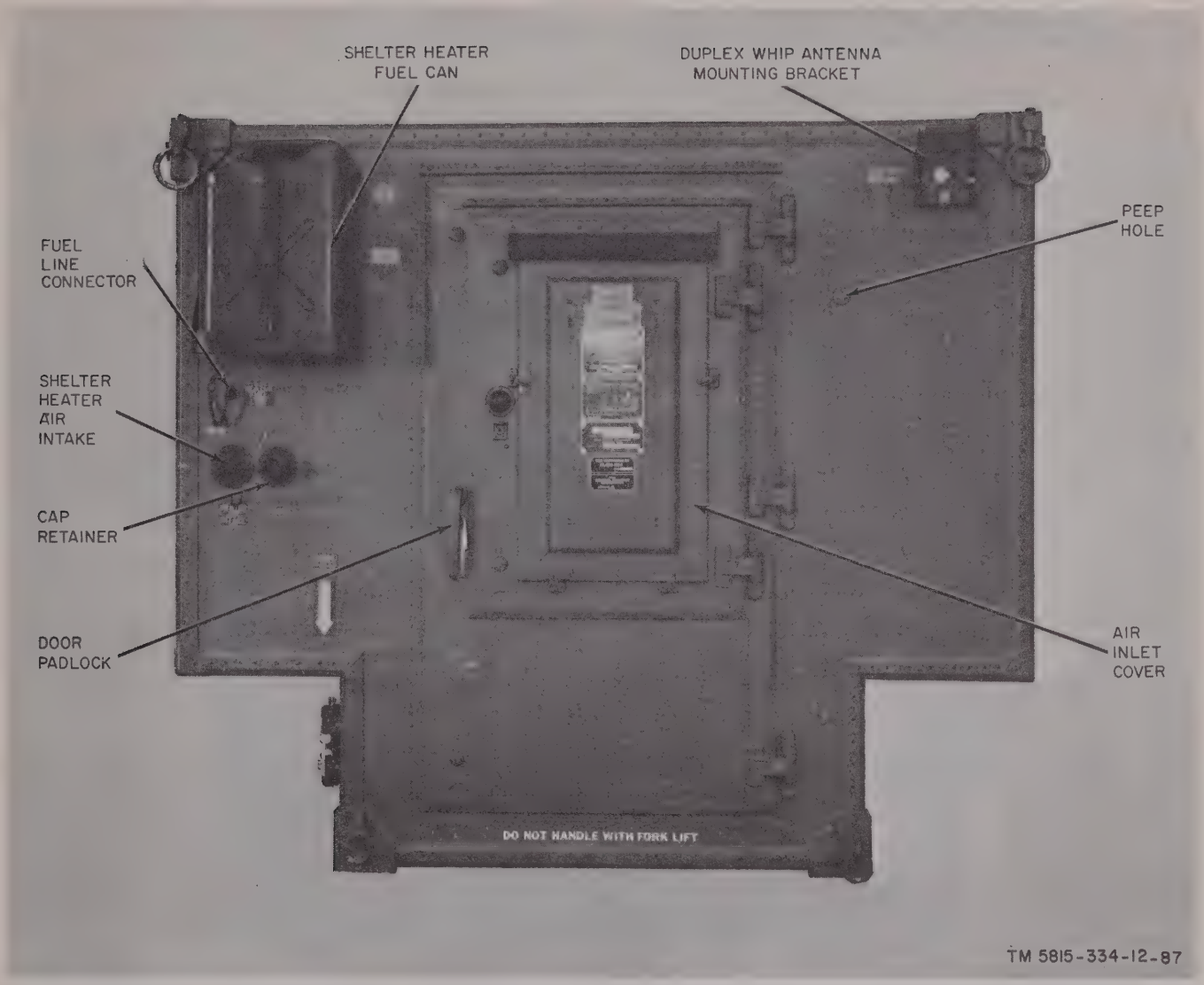



*Figure 1–16. Radio Teletypewriter Set AN/GRC–142B or AN/GRC–122B shelter S–250 exterior, rear wall.*

dependently to give a duplex capability. Signals picked up by the duplex RT–622/GRC are routed to the control panel (AN/GRC–122) or to Switch Assembly SA–1650/GRC (AN/GRC–122A, –122B) through the MD–522(*)/GRC. These send and receive signals can be routed to the duplex teletypewriter or to the remote location as desired. No remote duplex voice operation is possible.

*j. Tty Order Wire (Pony Circuit).* The tty order wire capability is present only in the AN/GRC–122(*). This circuit permits owr teletypewriter messages to be sent and received, over landlines, between the remote site and the shelter. It uses the duplex TT–98/FG in the shelter and a TT–98/FG at the remote site. The remote TT–98/FG is not supplied as part of the AN/GRC–122(*). Teletypewriter signals generated by the ow (pony) teletypewriter are routed through the remote box and through the control panel (AN/GRC–142 or AN/GRC–122) or through Switch Assembly SA–1650/GRC (AN/GRC–142A, –142B or AN/GRC–122A, –122B) to the duplex TT–98/FG in the shelter. The tty order wire circuit is not available during remote duplex tty operation.

## 1–14. Differences in Models

The radio teletypewriter sets discussed in this

manual differ in shelter models and shelter components as detailed in the following chart. An "X" in a model column indicates that the item is contained in that model.

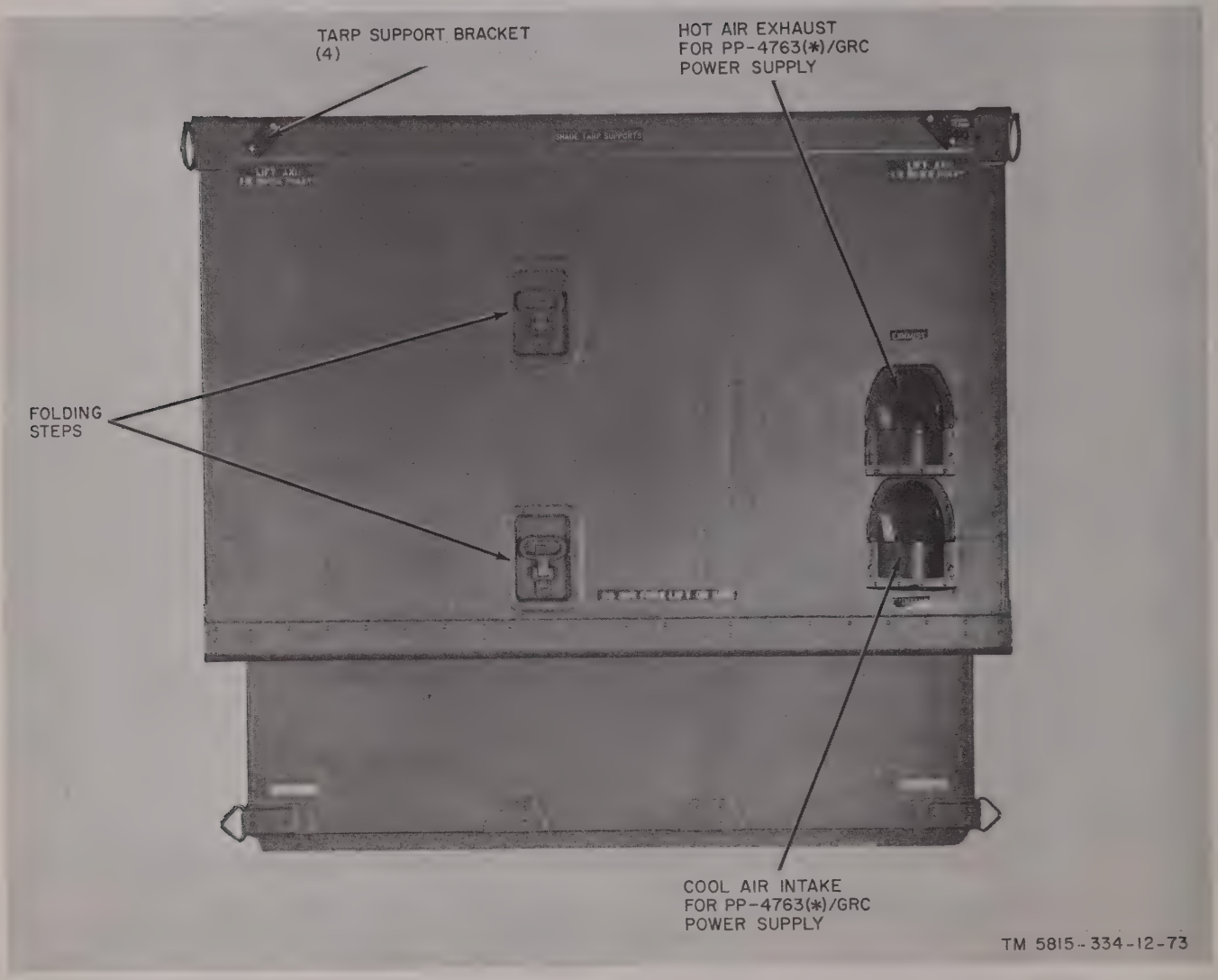



*Figure 1–17. Shelter exterior, curbside wall (typical of AN/GRC–142A, –142B or AN/GRC–122A, –122B).*

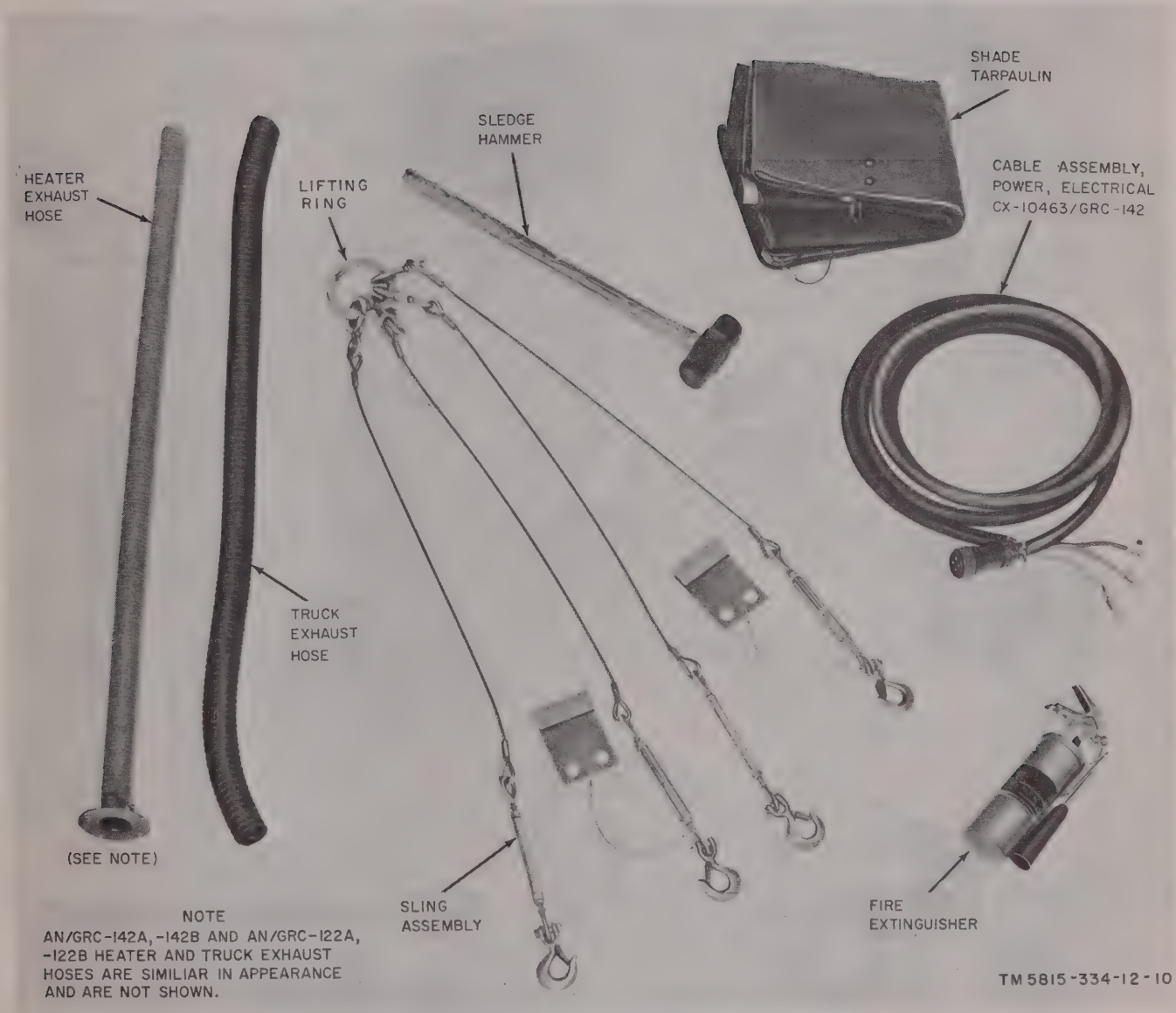



*Figure 1-18. Radio Teletypewriter Set AN/GRC-142(*) or AN/GRC-122(*) miscellaneous items.*


*Figure 1–19. Radio Teletypewriter Set AN/GRC–142(*), or AN/GRC–122(*), miscellaneous accessories.*

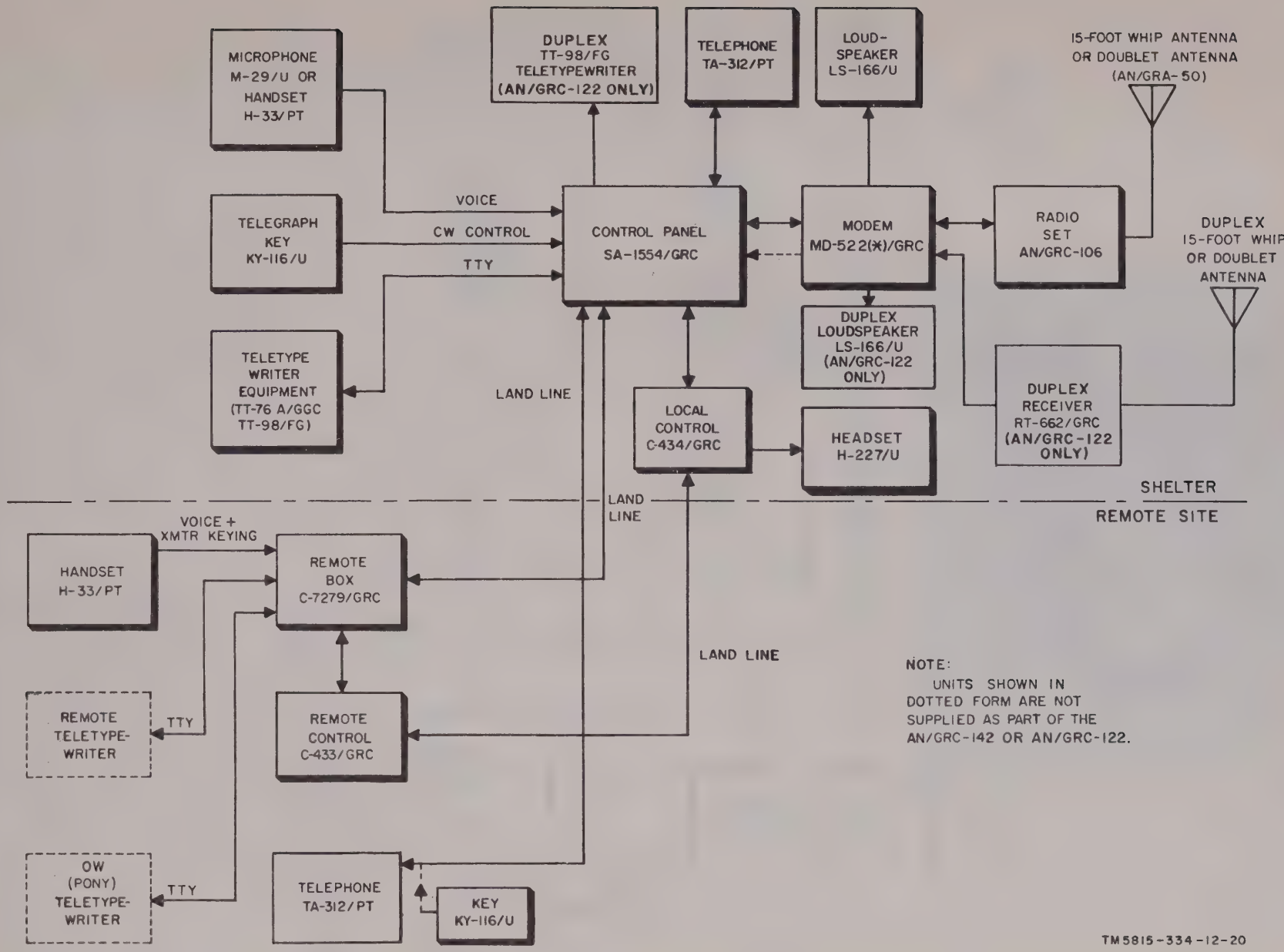



*Figure 1–20. Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122, simplified block diagram.*

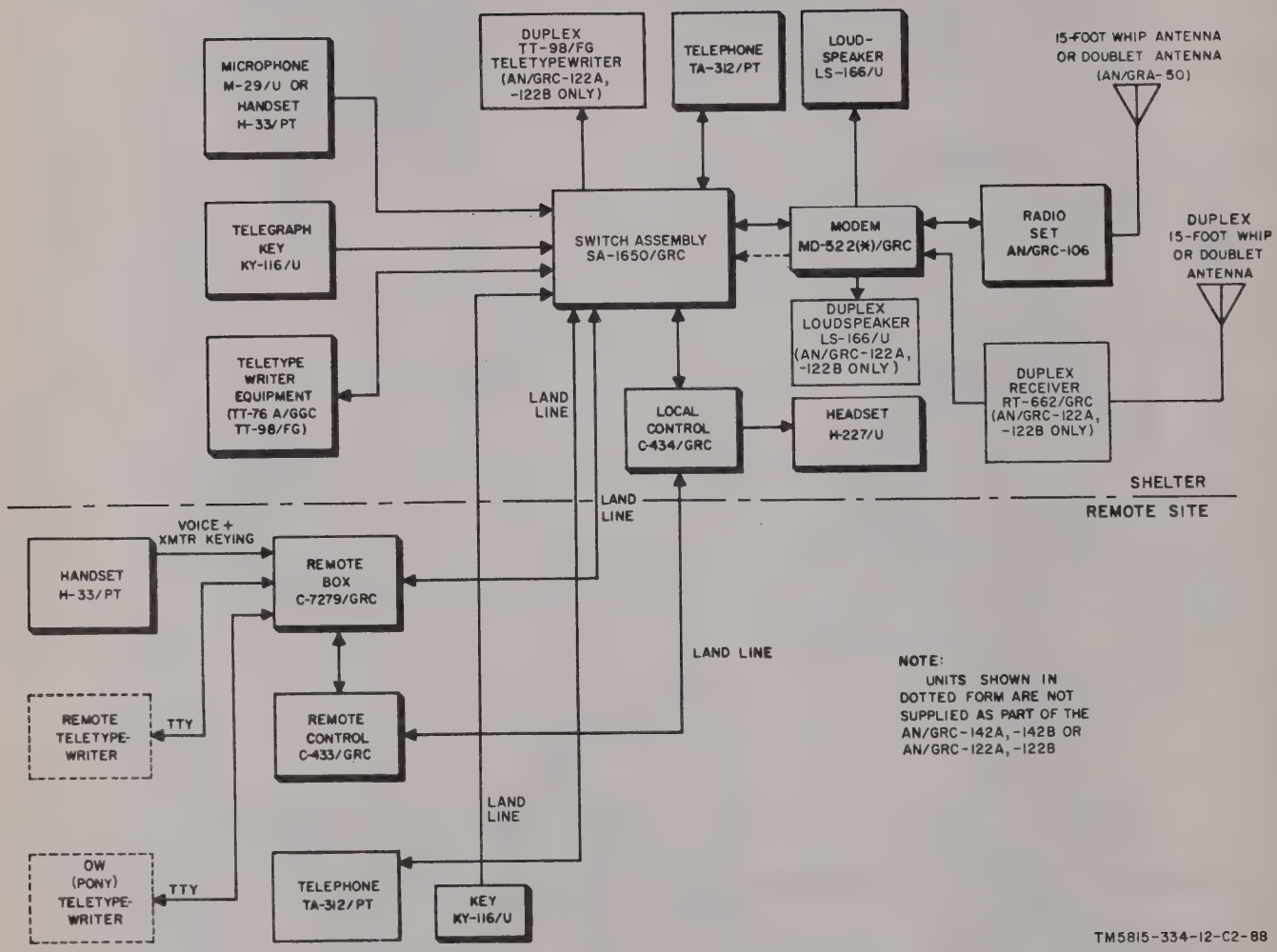



*Figure 1–21. Radio Teletypewriter Set AN/GRC–142A, -142B, or AN/GRC–122A, –122B, simplified block diagram.*

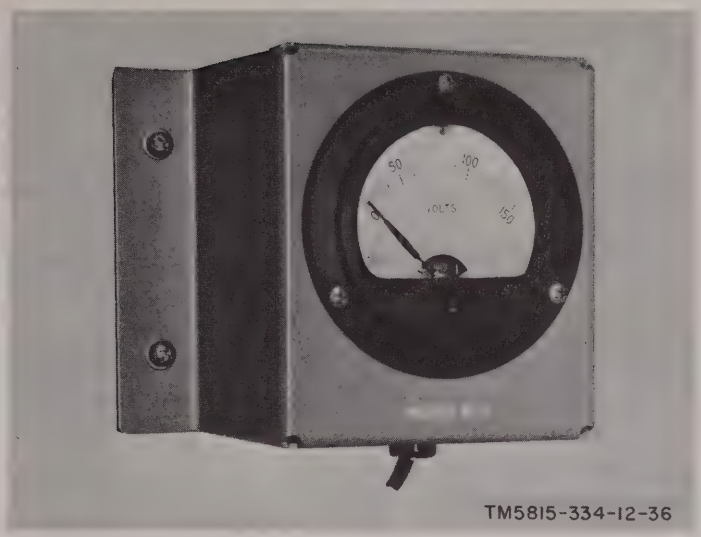



*Figure 1-22. Radio Teletypewriter Set AN/GRC-142 or AN/GRC-122, ac voltmeter, front oblique view.*

| Item | Model | | |
|---|---|---|---|
| | AN/GRC-142 or AN/GRC-122 | AN/GRC-142A or AN/GRC-122A | AN/GRC-142B or AN/GRC-122B |
| Shelter, Electrical Equipment S-318/G | X | X | |
| Shelter, Electrical Equipment S-318A/G | | X | |
| Shelter, Electrical Equipment S-250/G | | | X |
| Power/signal entrance box | | X | X |
| Dc entrance box | X | | |
| Ac entrance box | X | | |
| Panel, Power Distribution SB-3018/GRC-142 | X | | |
| Panel, Power Distribution SB-3358/GRC | | X | X |
| Switch Assembly, SA-1154/GRC-12 | X | | |
| Ac voltmeter (110 vac) | X | | |
| Switch Box SA-1555/GRC-142 | X | | |
| Distribution Box J-2776/GRC-142 | X | | |
| Air conditioner (AN/GRC-142, serial numbers 1 through 697 only) | | | |
| Power terminal assembly | | X | X |
| Switch Assembly SA-1650/GRC | | X | X |

# Chapter 2
# INSTALLATION

## Section I. SERVICE UPON RECEIPT OF EQUIPMENT

**WARNING**

During installation of this equipment, conform to all safety requirements in TB SIG 291. Injury or DEATH could result from failure to comply with safe practices.

### 2–1. General

This chapter contains information on unpacking, sitting, installing and performing initial adjustments to the AN/GRC–142(*) or AN/GRC–122(*). Information pertaining to the installation of the duplex equipment to convert the AN/GRC–142(*) models to AN/GRC–122(*) models is also included. Unless otherwise indicated, the following discussion refers to all models of radio teletypewriter sets discussed in this manual.

### 2–2. Unpacking
(fig. 2–1)

*a. Packaging Data.* When packed for shipment, the components of Radio Teletypewriter Set AN/GRC–142(*) or AN/GRC–122(*) are installed in the shelter, which is packed in a wooden crate.

*b. Uncrating.* Remove the shelter from the wooden crate as follows:

(1) Remove the crate panels by removing the 56 3/8-inch lag bolts. Remove the front and rear panels, then remove the top and side panels.

(2) Loosen the turnbuckles of the tiedown cables (not shown) that secure the shelter to the wooden base.

(3) Use a device capable of lifting 2,500 pounds to remove the shelter from the base of the crate. Attach the sling assembly (fig. 2–2) to the shelter lifting rings on the top corners of the shelter and raise the shelter off the base of the crate.

(4) Remove the base of the crate and lower the shelter to the ground.

### 2–3. Checking Unpacking Equipment

*a.* Inspect the equipment for damage which may have incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (para 1–3*b*).

*b.* See that the equipment is complete as listed on the packing slip. If a packing slip is not available, check the equipment against the lists in paragraphs 1–6, 1–7, and 1–8. Report all discrepancies in accordance with TM 38–750. Shortage of a minor assembly or part that does not affect proper functioning of the equipment should not prevent use of the equipment.

### 2–4. Siting

When locating the antenna (in the case of the AN/GRA-50) or the shelter (if the whip antenna is to be used), consider the following:

*a.* Radio signals are absorbed and sometimes reflected by nearby obstructions, such as hills, metal buildings and bridges, or telephone lines that extend above the height of the antenna. Transmitted signals have a greater range when the antenna is as high above ground as possible. Transmission and reception are best over water or level ground.

*b.* If transmission and reception in all directions are required, place the antenna on the highest hill within the designated area.

*c.* When in rear areas, avoid placing the set near sources of electrical interference, such as powerlines, or telephone lines, radar sets, and field hospitals.

*d.* Try several locations within the general area and select the one that provides the best signals from the desired stations.

*e.* Enemy jamming action against the receiver

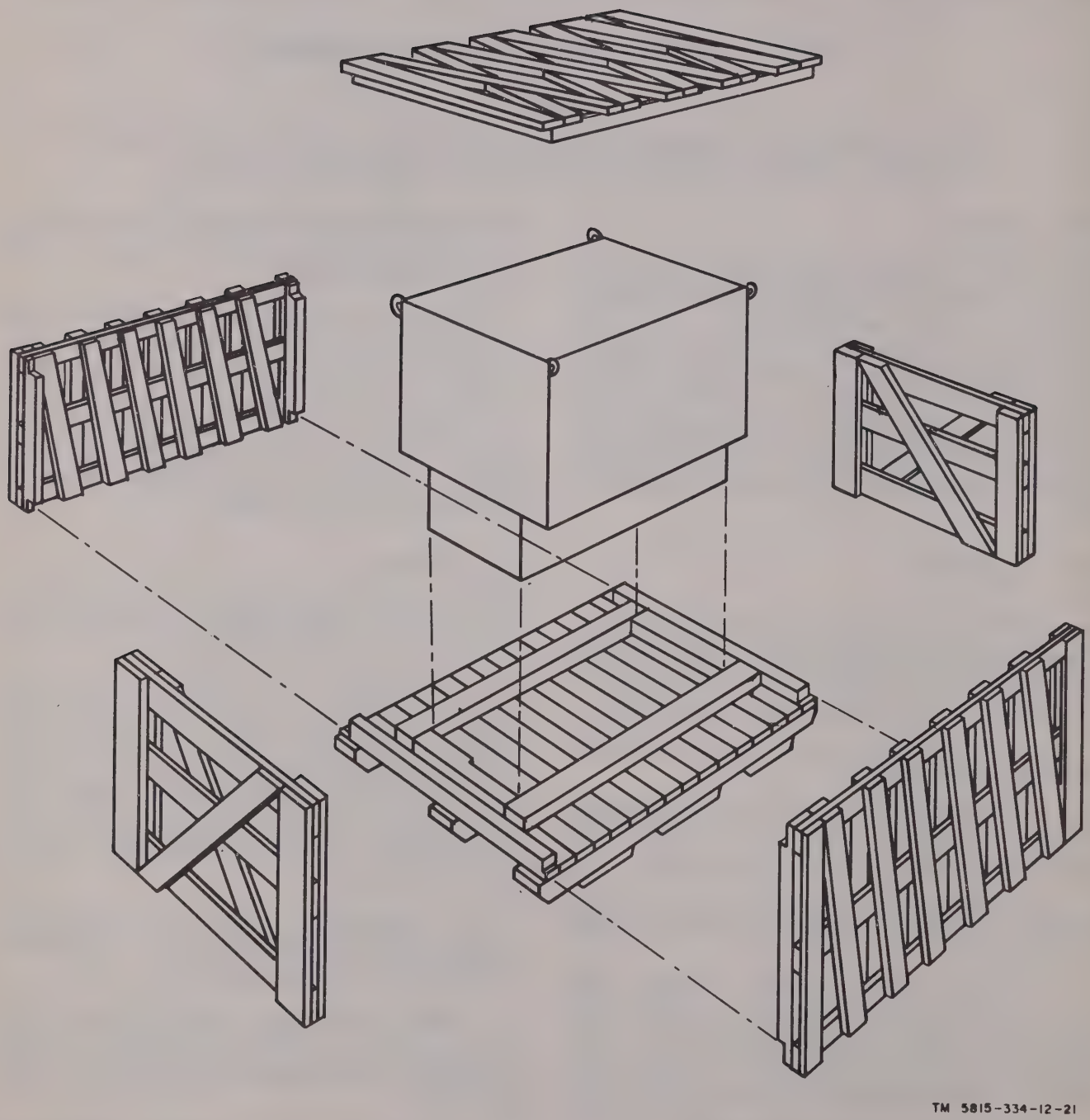



*Figure 2–1. Radio Teletypewriter Set AN/GRC–142(*) or AN/GRC–122(*), crating details.*

is always a possibility. The effects of enemy jamming may be reduced by locating the antenna so that nearby obstructions act as a screen in the direction of probable sites of enemy jamming transmitters. This screening action may also reduce the transmitted signal strength in a direction toward the enemy, thereby making it more difficult for the enemy to intercept the signals.

*f.* Place the shelter on level concrete blocks or wooden beams, if possible, and position it to facilitate cable connections to the power and signal entrance boxes. When installed on the ground, locate the shelter on level, dry ground with good drainage. Avoid, as much as possible, crossing power cables and field wires. Keep the antenna transmission lines (AN/GRA–50) as far as possible from the cables and field wires.

*g.* When the shelter is truck-mounted, a ladder should be secured to the truck tailgate. This ladder is not supplied with the AN/GRC–142(*) or AN/GRC–122(*).

## 2–5. Tools and Test Equipment Required for Installation

Tools and test equipment required for installation of Radio Teletypewriter Set AN/GRC–142(*) or AN/GRC–122(*) are listed below. The use of each item is also listed.

| *Item* | *Purpose* |
|---|---|
| Lifting device with 2,500-lb capacity. | Lift shelter. |
| Cement blocks or railroad ties | Provide foundation for shelter. |
| Guy rope, ½-inch diameter, 30 ft. | Use for guiding shelter during lifting operations. |
| Allen wrench | Fasten antenna tip. |

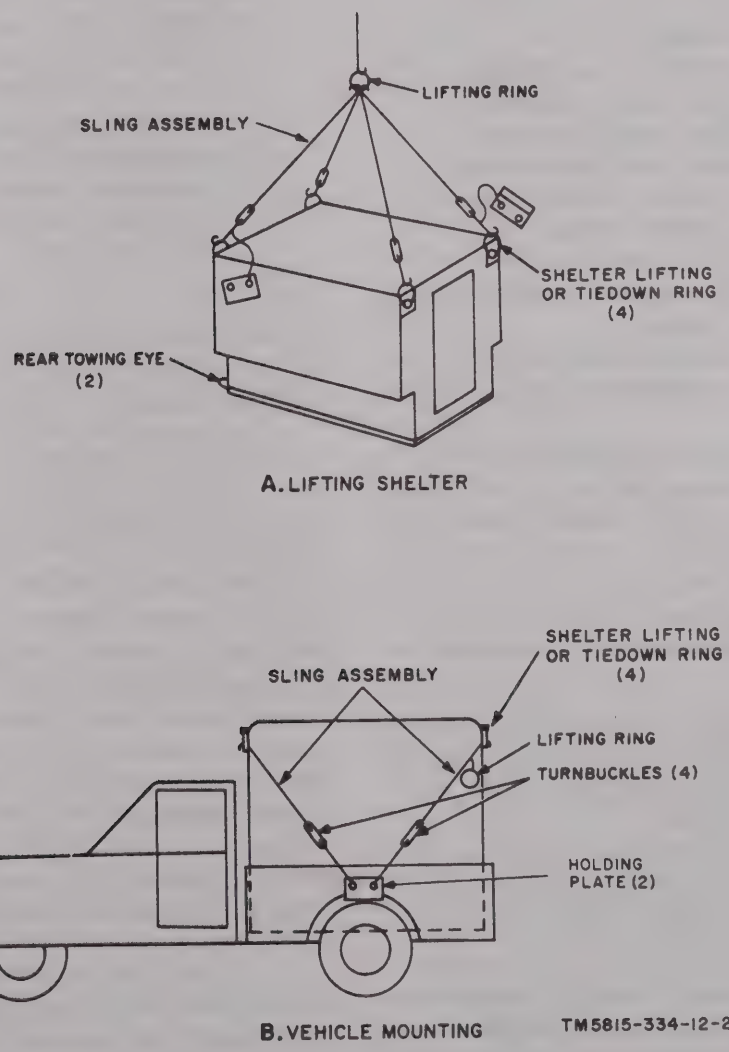



*Figure 2–2. Radio Teletypewriter Set AN/GRC–142(*) or AN/GRC–122(*), shelter installation details.*

## 2-6. Installation of Shelter

**NOTE**

To install the shelter on the ground or on a truck, four men and a device capable of lifting 2,500 pounds are required.

*a. Lifting and Loading Shelter* (A, fig. 2-2). If the shelter is to be transported by helicopter, follow the procedures given in (1) through (4) below. If the shelter is to be installed on a truck, follow the procedures given in (1) through (10) below.

(1) Use the sling assembly hooks (nearest the turn buckles) to connect the sling assembly to the shelter lifting rings.

(2) Place the sling assembly on top of the shelter.

(3) Connect the other four sling hooks to the lifting ring.

(4) Place the lifting ring over the hook on the lifting device.

**WARNING**

To avoid injury to personnel and damage to equipment, only the personnel engaged in the actual loading operation should be permitted near the truck, lifting device, and shelter. To eliminate confusion, all instructions must come from the loading crew supervisor.

(5) Tie a rope (½-inch diameter and at least 15 feet long) to each rear towing eye.

(6) Check to see that all tools and equipment have been removed from the truck body. Lower the truck tailgate.

(7) Slowly lift the shelter from the ground to a position high enough to clear the body of the truck.

(8) Back the truck into position under the shelter.

**WARNING**

All personnel must remain clear of the truck while the shelter is being lowered into position.

(9) Position a man at each of the ropes (5) above) to guide the shelter into position. Slowly lower the shelter onto the truck body.

**NOTE**

The shelter entrance door must be at the rear of the truck, and the front of the shelter against the front of the truck body.

(10) When the shelter is about 4 inches above the floor of the truck body, remove the ropes from the shelter rear towing eyes. Guide the shelter the rest of the way by hand.

(11) Remove the lifting ring from the lifting device hook and disconnect the lifting ring from the four sling assembly hooks. Remove the sling assembly center hooks from the lifting eyes.

*b. Securing Shelter to Truck* (B, fig. 2-2).

(1) Use the sling hooks farthest from the turnbuckles and hook each of the four sling assembly hooks to a tiedown eye on the shelter.

(2) Place the sling assembly holding plates (one for each side of the shelter) under the truck fenders.

(3) Engage the two sling assembly hooks remaining on each side of the shelter in their respective holes in the sling assembly holding plates.

(4) After the sling assembly has been attached to the truck body, righten the turnbuckles.

**NOTE**

To prevent the shelter from twisting in the truck body, tighten all turn buckles equally. Do not overtighten the turnbuckles.

(5) Raise and secure the truck tailgate.

**NOTE**

Refer to TB 11-2300-374-14-1 for instructions in the installation of blocking and tiedown kit for Shelter, Electrical Equipment S-318(*)/G on Truck, Cargo, 1¼ Ton, 6X6, M561, and Truck, Cargo, 1¼ Ton, 4X4, M715.

**NOTE**

Refer to TB 11-2300-372-14 for instructions in the installation of blocking and tiedown kit for Shelter, Electrical Equipment S-250( )/G on Truck, Cargo, 1¼ Ton, 6X6, M561.

*c. Unloading Shelter.* To unload the shelter from the truck, reverse the sequence for lifting, loading, and securing the shelter (*A* AND *B* ABOVE).

## 2-7. Grounding Shelter

The shelter must be properly grounded before any power is connected. Two ground rods (fig. 1-8 or 1-9) are provided; one for the shelter and the other for a portable generator, if used. Select a grounding site that will not interfere with the entrance door, field wires, power cables, or antenna transmission cables. Ground the shelter as follows:

*a.* Remove the ground rods and sledge hammer (fig. 1-7) from their mountings. Remove any paint or grease from the ground rods.

*b.* Connect one end of the ground strap to shelter ground terminal, select one site within reach of the other end of the ground strap and another within 10 feet of the portable generator (if used). Scoop out a small hole about 6 inches deep at each side.

*c.* Drive a ground rod into the hole at each site until the top of the ground rod is approximately 3 inches above ground level.

*d.* Saturate the ground around the rods with water to keep it moist.

*e.* Remove the ground strap from the storage drawer.

*f.* Connect the ground strap between the shelter ground terminal and the nearby ground rod. Refer to figure 1-12 (dc entrance box) for the AN/GRC-142 or AN/GRC-122 or to figure 1-13 (power signal entrance box) for the AN/GRC-142A, -142B, or AN/GRC-122A. Connect another ground strap between the ground terminal of the portable generator and the nearby ground rod.

*g.* Replace the sledge hammer in its mounting.

**2-7.1. Camouflage Procedures.**

**WARNING**

During combat or simulated combat conditions when the AN/GRC-142(*) or AN/GRC-122(*) must be camouflaged and metal poles are used to support camouflage netting, make certain that these poles are positioned at a minimum of 4 feet away from the whip antenna to avoid accidental contact between the poles and the antenna.

When the AN/GRC-142(*) or AN/GRC-122(*) is operated using one of the whip antennas (para 2-8) and a requirement exists to camouflage the AN/GRC-142(*), or AN/GRC-122(*) installation, perform the following procedures:

*a.* General camouflage instructions are contained in TM 5-200. However, if Radar Scattering Screen (NSN 1080-00-103-1246) is available, proceed as follows:

(1) Make a flap by cutting a circular arc of approximately 270 degrees in the garnish (vinyl) material to form a 16-inch diameter hole in the material. DO NOT CUT THE NETTING.

(2) Lay the garnish flap back to expose the netting.

(3) Temporarily secure the flap to the screen with the plastic tape provided in the camouflage repair kit (NSN 1080-00-108-1114).

(4) Pass the whip antenna through the center of the hole in the garnish material. Maintain an 8-inch radius between the whip antenna and the garnish material.

(5) When erecting the poles to support the camouflage screen, place the poles at least four feet from the whip antenna.

*b.* When the mission is completed and the camouflage screen is removed, reposition the garnish material flap in its original position and repair with the plastic tape.

**2-8. Antenna Installation and Connection**

The AN/GRC-142(*) is supplied with one whip and one doublet (AN/GRA-50) antenna. A whip antenna base is mounted at the shelter front to accommodate the antenna (figs. 1-12 and 1-13). A connector is provided on the shelter roadside wall for termination of the doublet antenna (figs. 1-8 and 1-9). An antenna bracket and a connector are mounted at the shelter rear to accommodate a duplex whip or doublet antenna (figs. 1-14 and 1-15). The AN/GRC-122(*) is equipped with the same antennas as the AN/GRC-142(*) plus a duplex whip and a duplex doublet antenna. As required, either the duplex whip or the duplex doublet antenna is used. The antenna near the shelter front roadside wall is for the AN/GRC-106; the antenna at the shelter rear is for the duplex RT-662/GRC (AN/GRC-122(*) only).

*a. Whip Antenna Assembly.* The shelter is shipped with the whip antenna mast base in a horizontal position. If the whip antenna mast base is in a vertical position, it must be placed in a horizontal position for antenna erection. If the antenna mast base is horizontal, omit the procedures in (1), (2), and (3) below.

(1) Disconnect the lead-in wire from the bottom of the antenna mast base by rotating the antenna base knob counter-clockwise and pulling the lead-in wire out.

(2) While holding the antenna mast base with one hand, remove antenna bracket pins by pulling them outward.

(3) Lower the antenna mast base to a horizontal position.

(4) Screw one antenna Mast Section MS-116-A into the antenna mast base. Screw a second MS-116-A into the one just installed.

(5) Slip the antenna cover clamp and the antenna cover onto the MS-116-A installed as instructed in (4) above).

(6) Slide the antenna cover down onto the antenna mast base as far as it will go.

(7) Push the antenna cover clamp down to the top of the antenna cover and tighten it.

(8) To the two MS-116-A antenna sections already installed ((4) above), add one MS-116-A, one MS-117-A, and one MS-118-A.

(9) Fasten one antenna tiedown clamp at the middle and one at the upper end of the antenna mast section.

(10) Tie the cord to the antenna tiedown clamps.

(11) Fasten the antenna tip (fig. 1-19) to the free end of the antenna.

(12) Raise the antenna to the vertical position and insert the antenna bracket pins into the antenna bracket to hold it in place.

(13) Connect the lead-in wire (antenna end of CG-3366/U) to the antenna mast base by inserting the lead-in wire into the antenna base connector, and tighten it by turning its knob clockwise.

*b. Antenna Group AN/GRA-50.*

(1) Install Antenna Group AN/GRA-50 (doublet antenna) as outlined in TM 11-5820-467-15.

(2) Connect the free end of the CG-678/U (part of AN/GRA-50) to the AN/GRA-50 ANTENNA connector on the shelter (fig. 1-8, 1-9, and 1-9.1).

(3) Connect the CG-2568A/U to the AM-3349/GRC-50 OHM LINE connector.

*c. Dipole Antenna Assembly for Transmitting and Receiving.* The transmitting and receiving antenna can be a half-wave doublet (fig. 2-2.5) which is normally operated at the half-wave fundamental of the desired frequency. If the antenna is to operate on more than one frequency, the radiating portion may be of a number of predetermined lengths of antenna wire separated by strain insulators and interconnected as required by jumpers. Remove the whip antenna, note where to connect the dipole lead-in cable (fig. 1-8, 1-9, 1-9.1), and then assemble the antenna as follows:

(1) List the operating frequencies.

(2) Refer to figure 2-2.1, and determine the overall antenna length for the fundamental frequency of each frequency assigned.

(3) Divide each overall antenna length ((2) above) by 2. This gives the antenna length, including strain insulators, of each side measuring from the coaxial connector block.

(4) Attach one end of the antenna wire to the coaxial connector block (B, fig. 2-2.2); use a splice conductor and the wingnut on the coaxial connector block, Run out the required length of antenna wire for the highest fundamental frequency to be used ((3) above), and connect it to the strain insulator. Construct the other half of the antenna in exactly the same manner.

(5) Attach the antenna wire for the next lower frequency to the unused end of the strain insulator of the antenna already constructed ((4) above). Allow enough wire for a jumper connection. Run out enough antenna wire to obtain the total length required (difference between highest frequency length and length required) for this frequency ((3) above) as measured from the center of the coaxial connector to the end of the section being constructed. Connect the free end to a strain insulator. Construct the other half of the antenna in exactly the same manner.

(6) Construct each additional lower frequency antenna by adding more antenna wire to the antenna already formed. Each antenna length should be measured from the center of the coaxial connector to the end of the antenna being constructed, including the length of the strain insulators.

(7) After the antenna is constructed, use the splice conductors to connect the required jumpers in place (A, fig. 2-2.2) for the primary operating frequency. Each antenna constructed will operate on the fundamental and odd harmonics of the fundamental frequency for which it is constructed. C, figure 2-2.2 shows an assembled antenna for 2,600, 2,750, 3,100, and 3,900 kilohertz (kHz). Figure 2-2.1 shows that a fundamental antenna for 2,600 kHz may also be used for 8,300, 13,800, or 19,300 kHz. Connect the coax to the connector block at the center of the dipole.

*d. Mast AB-155/U Erection.* Determine the position for the antenna to be erected. Determine the direction the antenna is to radiate. Stretch an assembled antenna along the ground in the desired position and direction. Place the antenna in a position (consider lead-in length) to allow proper connection of the antenna to the equipment shelter after it is raised. Plan to erect the end masts several feet beyond the end insulators. The center mast should be at the coaxial connector and offset 3 feet from the line of the antenna (fig. 2-2.5). A center mast will not be required if the overall antenna is less than 120 feet long. Erect each Mast AB-155/U as follows:

(1) Place Mast AB-155/U at each mast location and remove Cover CW-124/GRA-4 from Carrying Device MX-387/GRA-4.

(2) Drive the stake of Mast Base AB-154/U into the ground at the desired mast location with the swivel end pointing 45 degrees from the line of the antenna (fig. 2-2.3) If the ground is soft or sandy, place the mast base plate (fig. 2-2.5) on the ground and push it down firmly; then drive the stake of Mast Base AB-154/U through the hole in the mast baseplate.

(3) Align the female ends of Mast Sections MS-44 toward the mast base. Connect the first mast section (fig. 2-2.3) to Mast Base AB-154/U; add the second and third mast sections. Place a Guy Plate MX-378/U over the third section. Add the fourth and fifth sections; place a second MX-378/U over the fifth section. Add three more mast sections, and place a third MX-378/U over the last section.

(4) Slip a Guy Fastener MX-379/U over each guy stake before it is driven into the ground. Drive a guy stake (back guy stake) into the ground at the junction of the fifth and sixth MX-44 (25 feet from Mast Base AB-154/U). Place the front and side guy stakes 90 degrees apart as shown in figure 2-2.3. Use

a guy rope to measure the distance between the mast base and the front and side guy stakes. If the ground is soft or sandy, use the wooden stakes instead of the aluminum stakes, and loop the guys over the stakes. Do not use the MX-379/U.

(5) Fasten four Guys MX-383/GRA-4 to top Guy Plate MX-378/U, four Guys MX-381/GRA-4 to center Guy Plate MX-378/U, and the remaining four Guys MX-382/GRA-4 to bottom Guy Plate MX-378/U. Fasten the guys by snapping the fastener at the end of each guy into one of the four holes located 90 degrees apart on the MX-378/U. Next, carry the free ends of the three back guys to a side guy stake to measure their correct length. Fasten these guys to the back guy stake with Guy Fastener MX-379/U. Connect both sets of side guys to their respective side guy stakes, and remove slack by adjusting Slide Fastener FT-9 (fig. 2-2.3). Do not overtighten because the mast may bend. Keep the three front guys together, and stretch them along the mast toward the front guy stake.

(6) Remove Halyard MX-516/GRA-4 from the carrying device, and attach the snap fastener on the pulley to the unused hold in the top Guy Plate MX-378/U. Slip the rope through the pulley (fig. 2-2.5), and tie the ends of the rope near the mast base to keep the rope from running through the pulley when raising the mast.

(7) To raise the mast (fig. 2-2.4), three men are required. Man No. 1 holds the front guys and pulls steadily on them, keeping slightly more tension on the top guy to bow the mast slightly while being raised. Man No. 2 takes a psoition near the mast base and holds Mast Base AB-154/U in the designated position as the mast is raised. Man No. 3 stands near the top end of the mast and raises it as he walks toward the mast base.

(8) Adjust the guys until the mast is vertical. Whenever a guy is tightened, the opposite one may have to be loosened slightly to keep the mast from bowing.

*e. Antenna Raising.* When operating within the frequency range of 2.0 to 4.0 MHz, the length of the antenna wire requires the use of three 40-ft Masts AB-155/U or other convenient supports for each antenna. At frequencies above 4.0 MHz, only two masts or supports are required for each antenna. Each antenna should be positioned broadside to the direction of transmission or reception.

(1) If a center (AB-155/U) mast is used, attach the fastener on Halyard MX-516/GRA-4 to the coaxial connector.

(2) Fasten Halyard (if used) MX-516/GRA-4 on each end mast to the antenna wire by attaching one end of a wire (approximately 15 inches of antenna wire) to the end strain insulator, and the other end to the fastener assembly on Halyard MX-516/GRA-4.

(3) Pull the antenna wire into position with Halyards X-516/GRA-4. Tie the rope to the mast to prevent the weight of the antenna wire from pulling the loose end of the rope back through the pulley. Figure 2-2.5 shows a doublet antenna completely erected.

NOTE

The antenna lead-in should be raised off the ground on poles if possible. In cold weather, raising the lead-in prevents the antenna lead-in from freezing to the ground, and at all times, minimizes damage which might result from lying in the ground. In addition, the antenna lead-in should be taped to both the mast and the shelter to relieve the tension on the coaxial connector.

**2-9. Installation of Dc and Ac Power**

For complete operation, the AN/GRC-142(*) or AN/GRC-122(*) must be connected to a dc and an ac power source. The dc power source provides power for all units in the shelter except the air conditioner (AN/GRC-142, serial numbers 1 through 697 only) and the ac outlet strip. Operation at a reduced capability is possible from either a dc source (no ac) or an ac source (no dc). If a dc source only is selected, the air conditioner and ac outlets will be inoperative. If an ac source only is selected, the dc convenience outlet, and the shelter heater will be inoperative. (In the AN/GRC-142 or AN/GRC-122 only, in the shelter exhaust blower will also be inoperative). To conserve battery power, it may be desirable to use the ac only mode even though the shelter is connected to the vehicle battery. Under this condition pull the power panel MAIN circuit breaker (AN/GRC-142 or AN/GRC-122) or pull the DC MAIN circuit breaker (AN/GRC-142A,-142B or AN/GRC-122A,-122B) to disconnect the vehicle battery from the shelter power system.

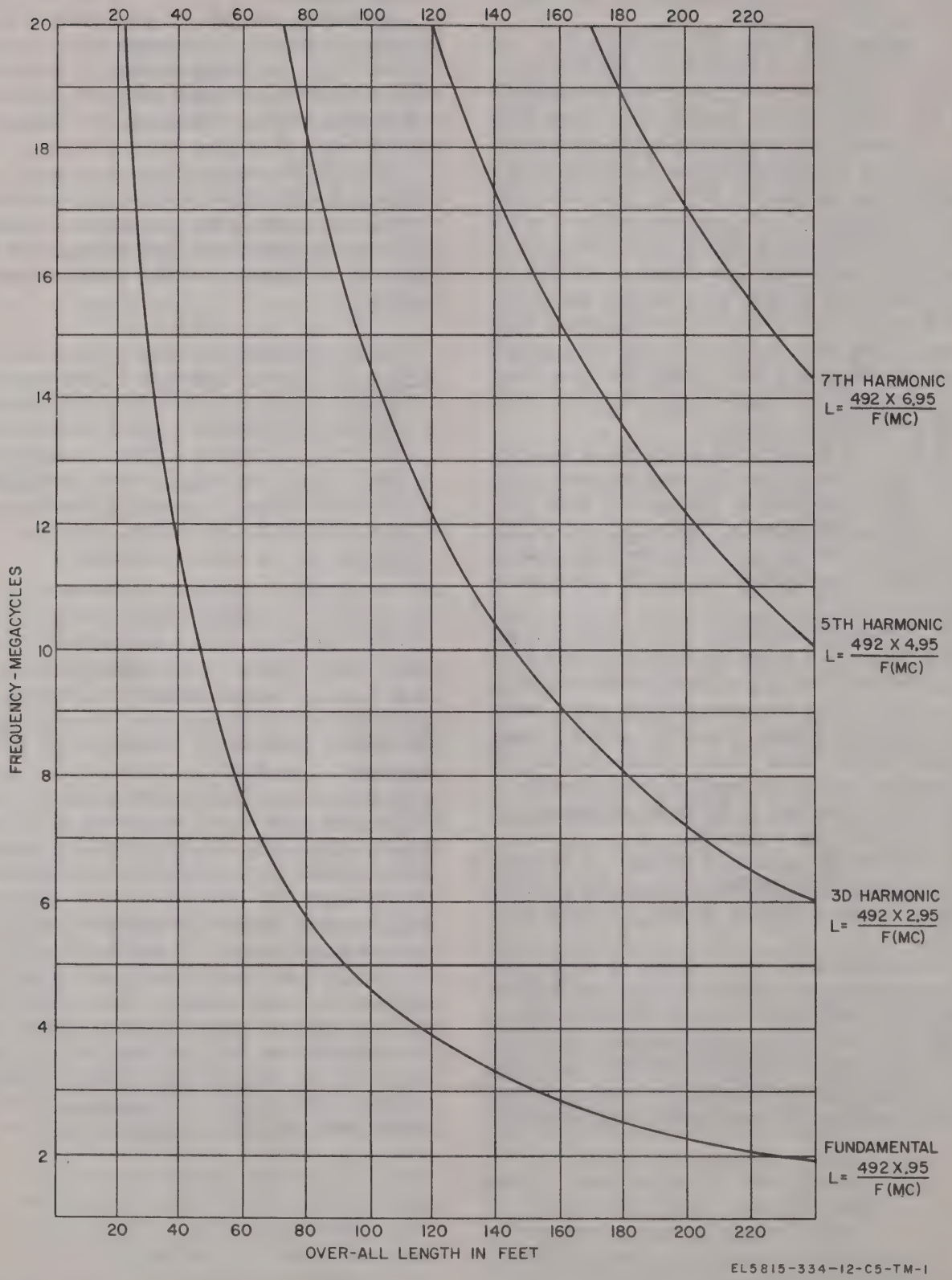



*Figure 2-2.1. Graph of antenna length versus frequency.*

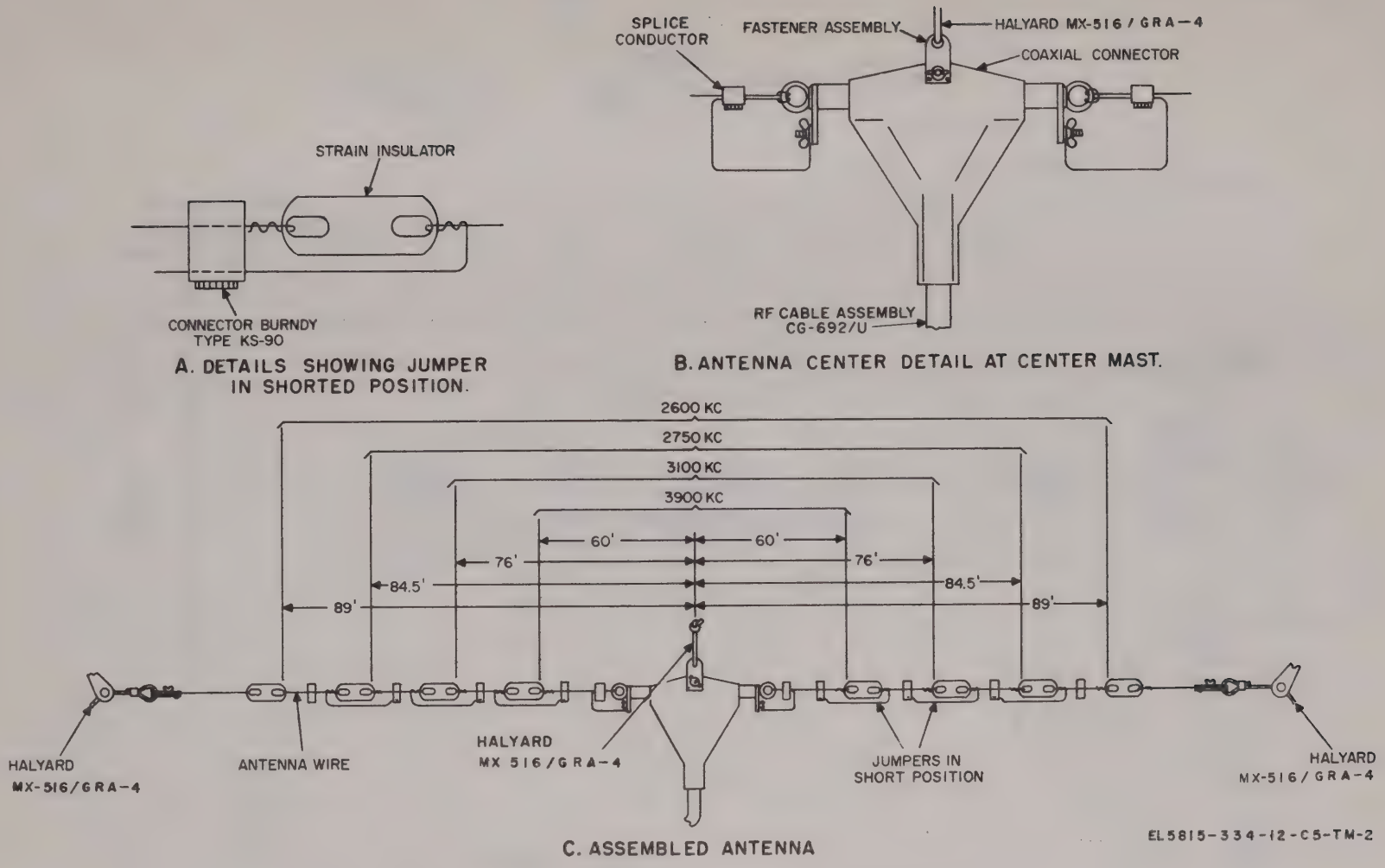



*Figure 2-2.2. Construction and assembly of doublet antenna.*

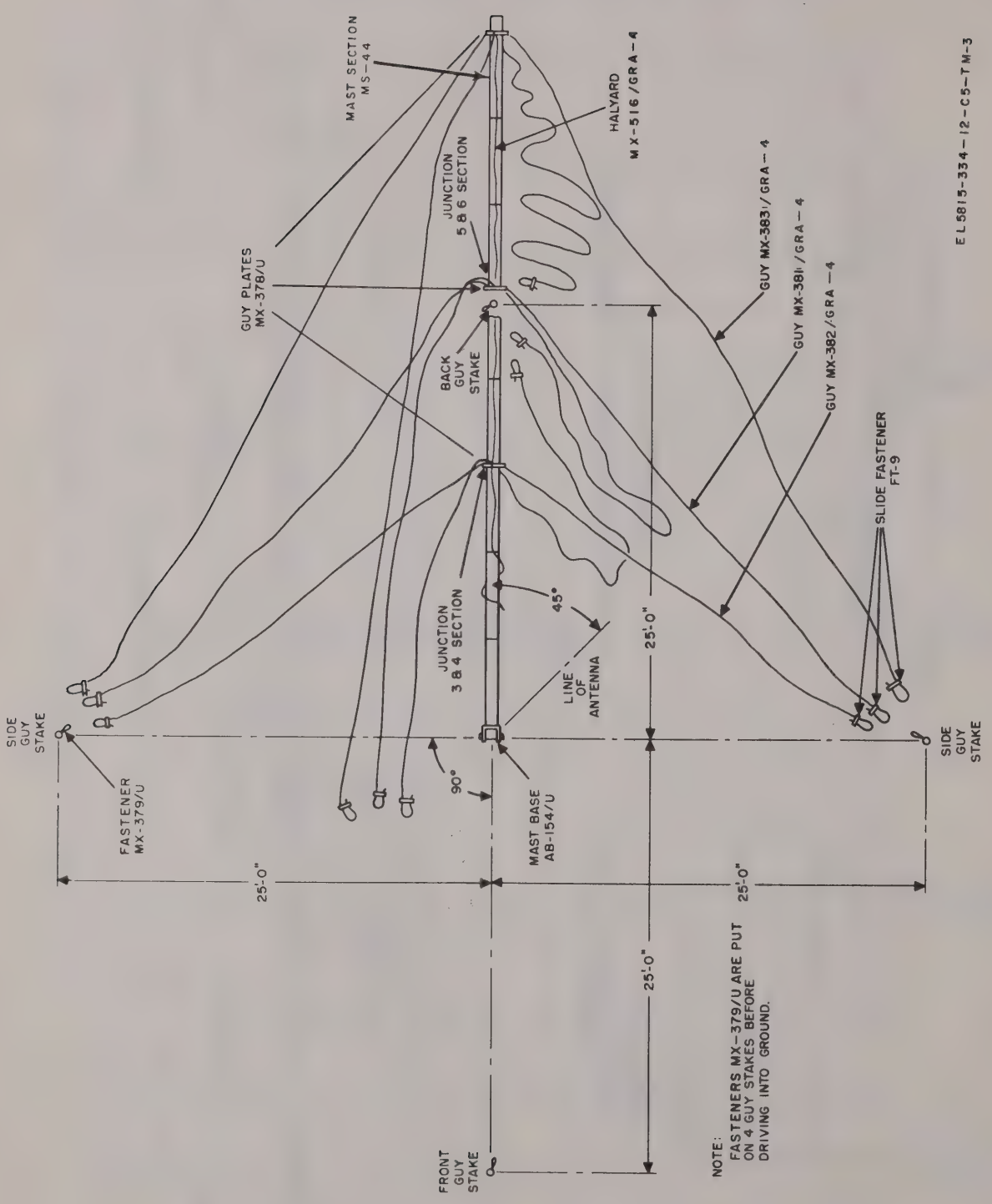



*Figure 2-2.3. Preparing Mast AB-155/U for erection.*

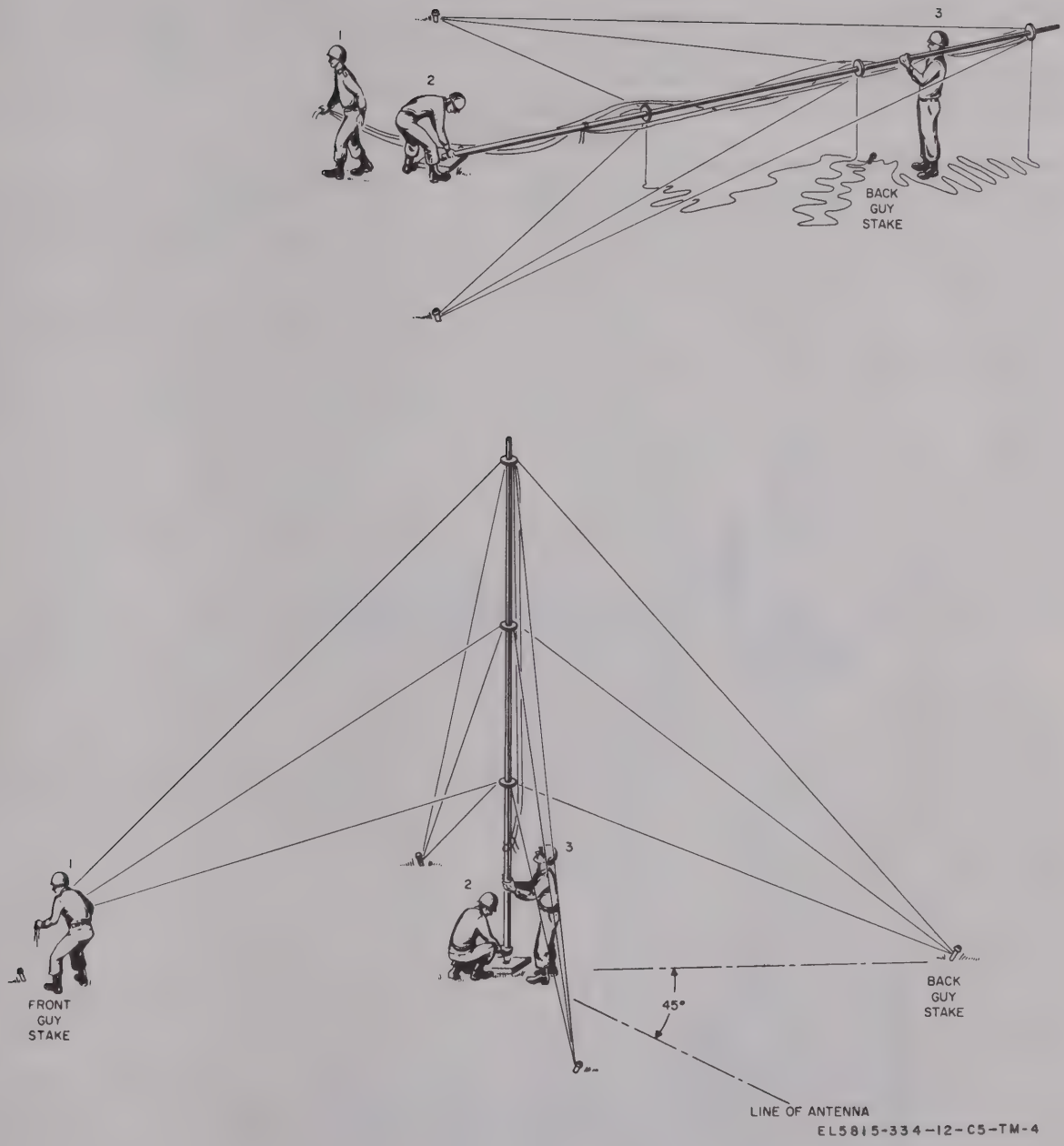



*Figure 2-2.4. Raising assembled Mast AB-155/U.*

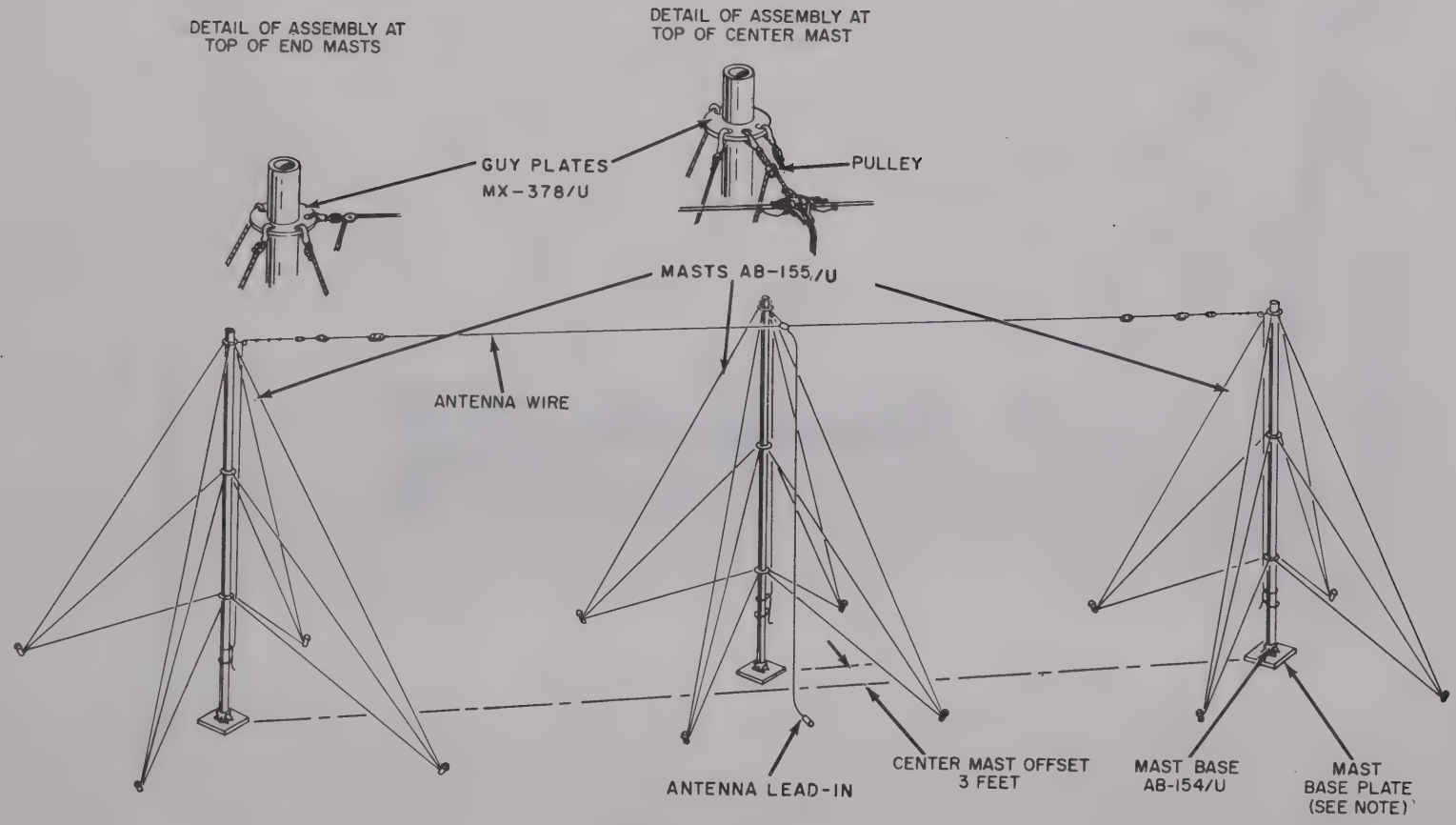



*Figure 2-2.5. Doublet antenna, erection completed.*

*a. Preliminary Procedures.* Before making any power connections, proceed as follows:

(1) Operate all circuit breaker switches and equipment switches to off (para 3-12*b* for the AN/GRC-142 or AN/GRC-122 or para 3-23*b* for the AN/GRC-142A, -142B or AN/GRC-122A, -122B).

(2) Insure that the shelter has been grounded as directed in paragraph 2-7.

(3) Remove the covers from the shelter ac or dc receptacles as required.

CAUTION

If the shelter is connected to a dc source other than the truck battery, the security (during secure operation) of the system may be adversely affected.

*b. Connection of Dc Power.* The dc power cable (CX-10463/GRC-142, fig. 1-8) is supplied with the AN/GRC-142(*) or AN/GRC-122(*) to connect the shelter to the truck battery. This cable may also be used to connect the shelter to other sources of dc power, such as a portable generator. Connect the power cable to the truck battery as follows:

(1) Connect dc power cable plug P1 to the shelter DC INPUT connector (fig. 1-12 or 1-13).

(2) Route the other end of the dc power cable through the rear of the truck to the battery compartment. (It may be necessary to remove the knockout at the rear of the truck battery box to permit passage of the cable.)

NOTE

In the event that a knockout is not provided, it will be necessary to cut a hole 1½ inches in diameter in the back of the cab directly behind the battery box. On all installations the cable port must be fitted with a rubber gromet.

(3) Connect the black lead from terminal C of the dc power cable plug to the negative (—) side of the battery by removing the bolt from the battery connector, inserting the cable lugs, and replacing the bolt. Make sure that all connections are clean and tight.

(4) Connect the red lead from terminal A of the dc power cable plug to the positive (+) side of the battery. Make the connection the same way as for the negative terminal.

(5) Connect the end of the cable shield to a convenient chassis ground.

*c. Connection of Ac Power.* On certain models, an ac power cable must be fabricated (fig. 2-3) for connection to the shelter ac input connector. Check the packing slip to determine if the ac power cable has been supplied. A diagram of this cable is shown in figure 2-3. Number 4 or 6 AWG wire is recommended; however, for long runs, it may be necessary to use larger wire.

### 2-10. Installation of Shade Tarpaulin (AN/ GRC-142 and AN/ GRC-122 Only)

*a.* Place the shade tarpaulin on the shelter roof, positioning it so that its ropes fall down the curbside wall of the shelter.

*b.* Insert the four shade tarpaulin supports on the shelter roadside and engage the shade tarpaulin eyelets on the support ends.

*c.* Insert the four shade tarpaulin supports on the shelter curbside and engage the shade tarpaulin eyelets on the support ends.

*d.* Secure the four shade tarpaulin ropes to the four tiedowns near the bottom curbside edge of the shelter wall.

### 2-11. Installation of Shade Tarpaulin (AN/ GRC-142A, -142B, or AN/ GRC-122A, -122B Only)

*a.* Insert the two shade tarpaulin supports on the shelter roadside and engage the shade tarpaulin eyelets on the support end.

*b.* Insert the two shade tarpaulin supports on the shelter curbside and engage the shade tarpaulin eyelets on the support ends.

### 2-12. Installation of Remote Units

This paragraph contains the installation procedures for the following remote units: Remote Control C-7279/GRC, Remote Control C-433/GRC, remote Telephone Set TA-312/PT, remote Handset H-33/PT, remote Key, Telegraph KY-116/U, remote Teletypewriter TT-98/FG, and remote teletypewriter, Reperforator-Transmitter TT-76A/GGC. These instructions cover all models unless otherwise noted. A typical installation is shown in figure 2-5 or 2-6. This figure shows a full-duplex setup (AN/GRC-122(*) only) at the remote site. The remote site can be up to a maximum distance of 1 mile from the shelter. The configuration shown in the figure will vary depending on communication requirements. A 110-volt ac power source is required at the remote site for operation of the teletypewriter machines. Ac power requirements will depend on the type and number of teletypewriter machines being used at the remote site. Details contained in *a* through *g* below explain some of the configurations that can be used.

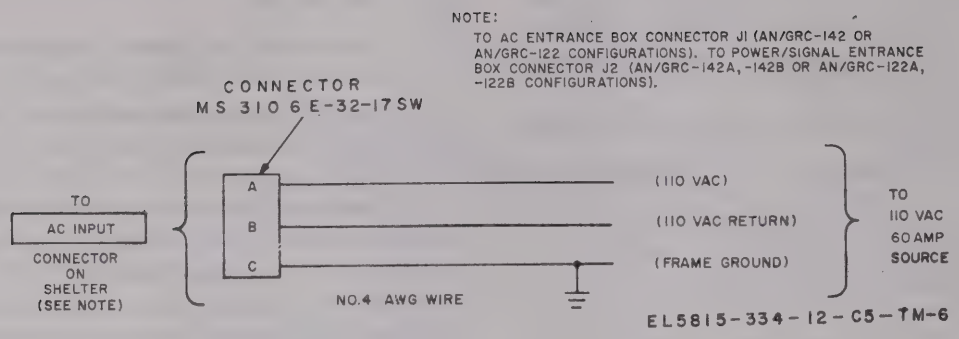



*Figure 2-3. External ac source power cable, fabrication details.*

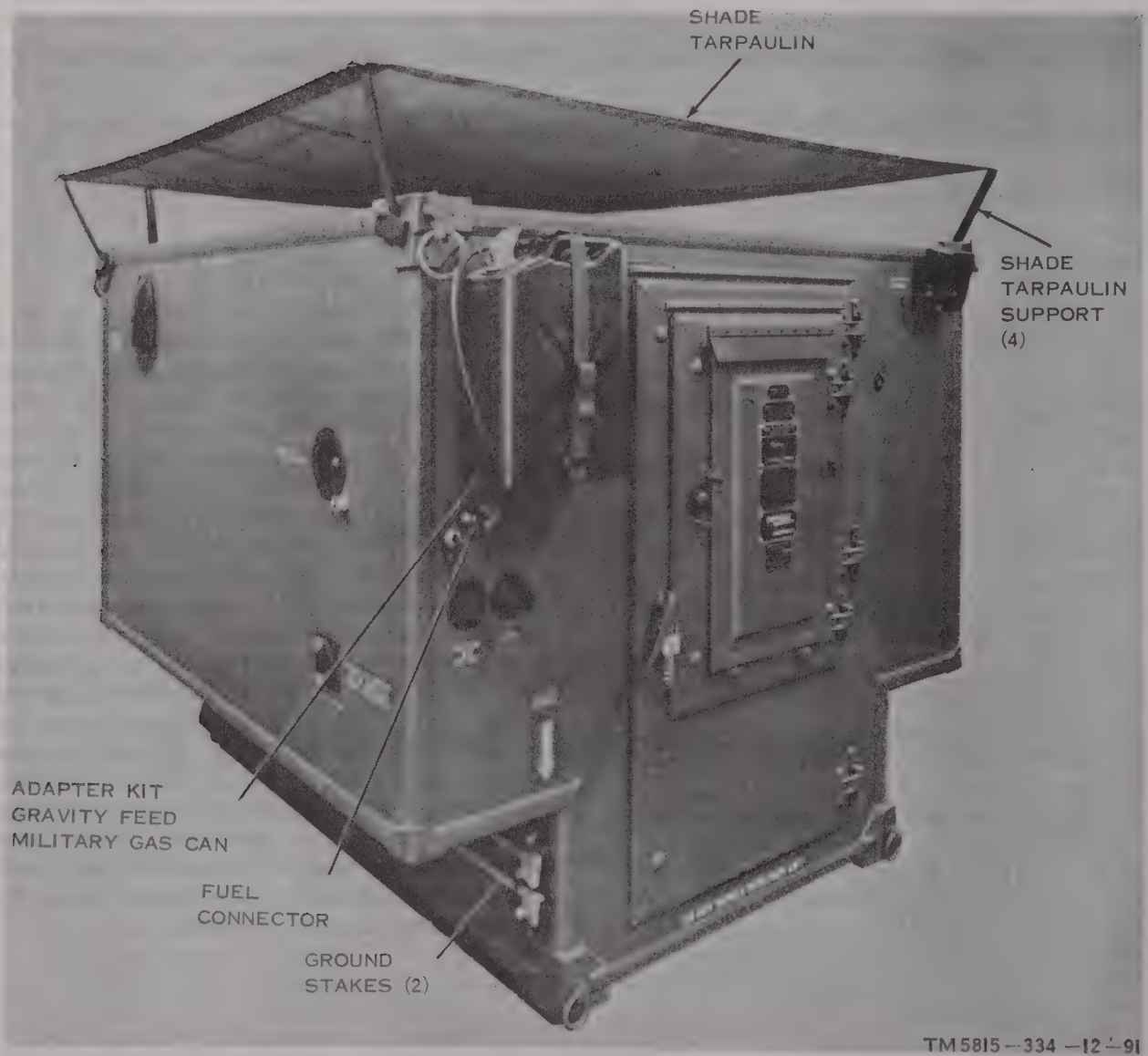



*Figure 2-4. Shade tarpaulin installation details, AN/GRC-142A, -142B, or AN/GRC-122A, -122B.*

*a. Remote Box Installation.* The remote Box requires one pair of landlines for owr operation (OWR DX-SEND TTY loop) and an additional pair of landlines for remote duplex or pony operation (AN/GRC-122(*) only) (DX-RECEIVE TTY loop). Figure 2-5 shows only two teletypewriters connected to the remote box. The remaining jacks on the remote box provide termination for additional teletypewriter equipment. All the OWR DX-SEND TTY jacks are in series with each other. All DX-RECEIVE TTY jacks are in series with each other. This arrangement allows a total of six teletypewriters to be connected into each loop. Connect the landlines as follows:

(1) Connect the landlines between the shelter and remote box as shown in figure 2-5 (AN/GRC-142 or AN/GRC-122) or figure 2-6 (AN/GRC-142A, -142B, or AN/GRC-122A, -122B). Landlines connected to the DX-RECEIVE TTY section of the remote box need not be made if the remote duplex or pony circuit capability (AN/GRC-122(*) only) is not required.

(2) Connect pendant plug P1 of the remote box to the C-433/GRC, AUDIO connector.

*b. Remote Control C-433/GRC Installation.* One pair of landlines is required for operation of the C-433/GRC. The landlines, which originate at the shelter dc entrance box (AN/GRC-142 or AN/GRC-122). C-433/GRC binding posts are connected to posts L1 and L2 on the C-433/GRC front panel. Mark the C-433/GRC SELECTOR switch write-on surfaces as follows: left switch position "1" and the middle switch position "2". For battery and accessory installation details, refer to TM 11-5038.

NOTE

In the AN/GRC-142A, -142B or AN/GRC-122A, -122B configuration, the landlines originate at the power/signal entrance box C-433/GRC binding posts (fig. 2-6).

*c. Remote Telephone TA-312/PT Installation.* The TA-312/PT may be located at the main remote site or at a secondary remote site. It requires one pair of landlines for operation. Connect these landlines between the shelter dc entrance box (AN/GRC-142 or AN/GRC-122) TA-312/PT binding posts and the LINE L1 and LINE L2 binding posts on the TA-312/PT.

NOTE

In the AN/GRC-142A, -142B or AN/GRC-122A, -122B, the landlines originate at the power/signal entrance box TA-312/PT binding posts.

*d. Remote Handset H-33/PT Installation.* Handset H-33/PT connects to the remote box AUDIO connecotr.

*e. Remote Key, Telegraph KY-116/U Installation.* One pair of landlines is required for operation of the KY-116/U. In early models of the AN/GRC-142, -122, the landlines, which originate at the shelter dc entrance box TA-312/PT binding posts are connected to the KY-116/U instead of the TA-312/PT and the telephone capability is sacrificed. In the later models, the landlines originated at the shelter dc entrance box SPARE, or REM CW terminals and simultaneous remote cw and field telephone operation is possible. The KY-116/U may be located at the remote site, or at a secondary remote site. In the AN/GRC-142A, -142B or AN/GRC-122A, -122B, the KY-116/U is connected directly to the REM CW terminals of the power/signal entrance box.

*f. Remote Teletypewriter TT-98/FG Installation.* The TT-98/FG is connected into the system at the remote box. Figures 2-5 and 2-6 show the TT-98/FG plugged into an OWR DX-SEND TTY jack of the remote box. However, it can be connected into the duplex receive pony loop by inserting the TT-98/FG plugs into the remote box DX-RECEIVE TTY jacks. Before installation, the TT-98/FG selector magnet wiring must be checked to see that it conforms with the loop current (either 60 or 20 milliamperes (ma)) that has been selected at the shelter. Refer to paragraph 2-15 for system loop current adjustment details, and to TM 11-5815-200-12 for TT-98/FG wiring details.

*g. Remote Teletypewriter Reperforator-Transmitter TT-76A/GGC Installation.* The three TT-76A/GGC plugs are connected into the system at the remote box. The TD (gray) plug is usually plugged into a remote box OWR DX-SEND TTY jack. For owr tty operation, all three of the TT-76/GGC plugs are plugged into the remote box OWR DX-SEND jacks. For duplex operation, the TD (gray) plug and keyboard (black TR) plug are plugged into the remote box OWR DX-SEND TTY jacks and the receive (red) plug is plugged into a DX-RECEIVE TTY jack. For pony circuit operation, all three of these plugs are plugged into the remote box DX-RECEIVE TTY jacks. Before installation, the TT-76A/GGC selector magnet wiring must be checked to see that it conforms with the loop current (20 or 60 ma) selected at the shelter. Refer to paragraph 2-15 for system loop current adjustment details. Refer to TM 11-5815-238-12 for TT-76A/GGC wiring details.

### 2-13. Removal of Dummy Box and Installation of Security Equipment (AN/ GRC-142 or AN/ GRC- 122 Only)

(fig. 1-1, 6-1, and 6-2)

To install the security equipment it is necessary to remove the dummy boxes. Two dummy boxes are

contained in the AN/GRC-142 or AN/GRC-122, the lower one is in the OWR DX-SEND TTY loop, the upper one is in the DX-RECEIVE pony loop. One or both of these dummy boxes are removed, depending on the mode of operation, to connect security equipment to the AN/GRC-142 or AN/GRC-122.

Remove each dummy box as follows:

*a.* Disconnect banana plugs E1, E2, and E3 and connectors J1 and J2 from the dummy box.

*b.* Unclamp 28-volt dc connector W28P1 or W30P1.

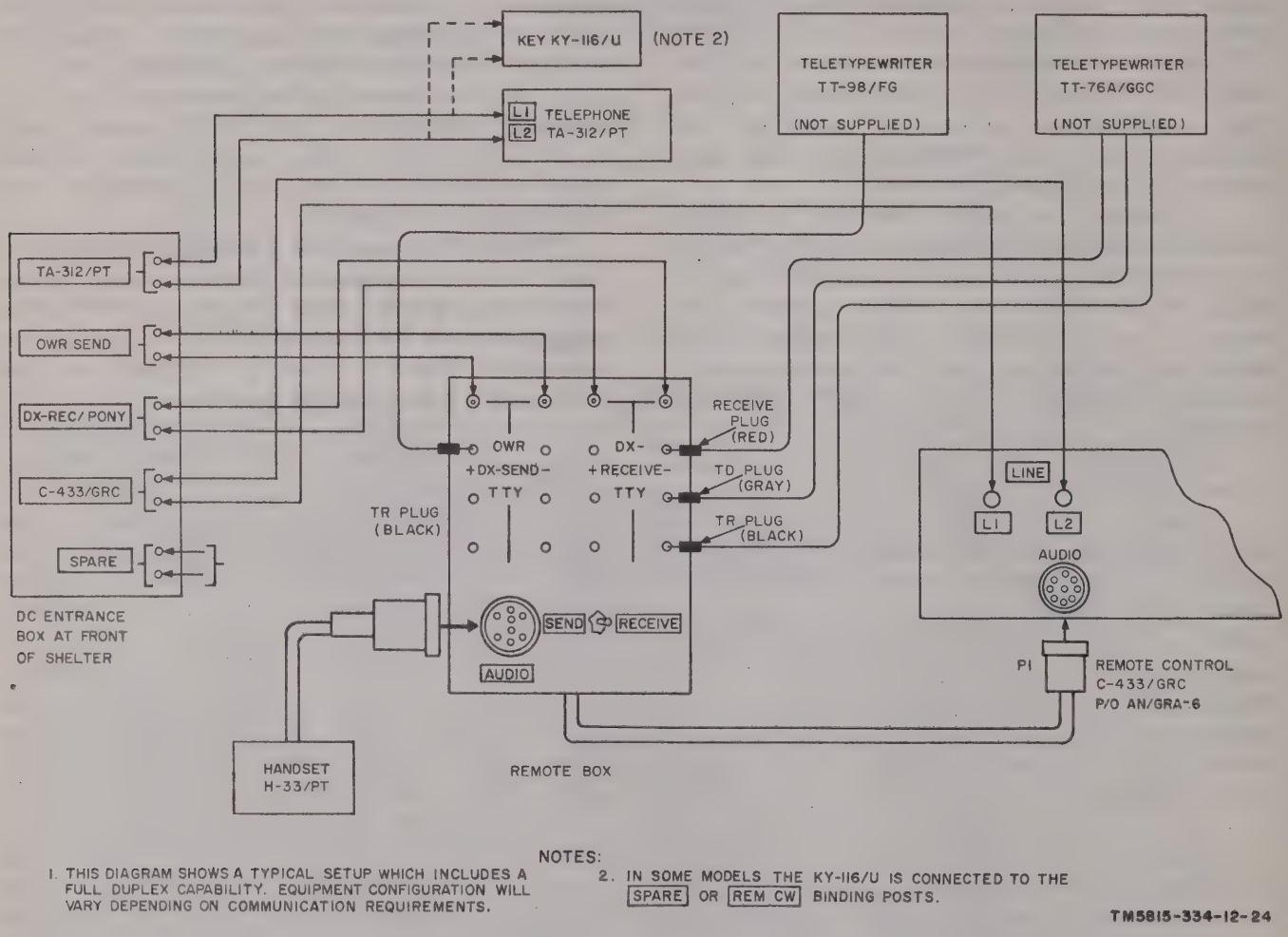
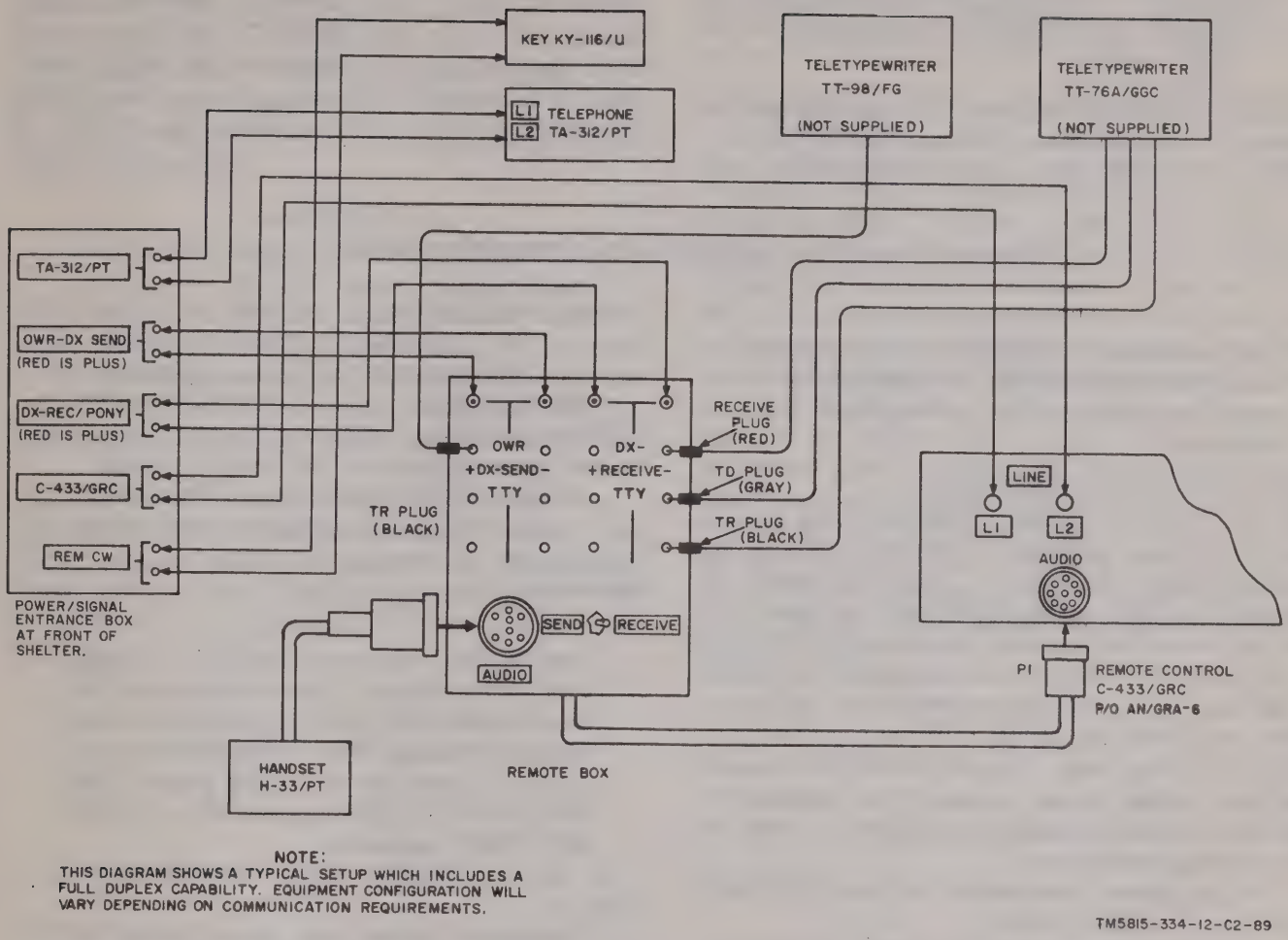



*Figure 2-5. Radio Teletypewriter Set AN/GRC-142 or AN/GRC-122, typical remote operating setup.*




NOTE:
THIS DIAGRAM SHOWS A TYPICAL SETUP WHICH INCLUDES A FULL DUPLEX CAPABILITY. EQUIPMENT CONFIGURATION WILL VARY DEPENDING ON COMMUNICATION REQUIREMENTS.

TM5815-334-12-C2-89

*Figure 2-6. Radio Teletypewriter Set AN/GRC-142A, -142B or AN/GRC-122A, -122B, typical remote operation setup.*

*c.* Loosen the captive screws on both sides of the dummy box and remove the dummy box.

*d.* When installing the security equipment perform the following on the secuurity equipment perform the following on the security equipment rear panel.

(1) Connect a jumper wire between E2 and E4.

(2) Connect shorting plugs to LOOP IN-2 and LOOP OUT-2 receptacles.

(3) Connect the White banana plug to E1, Black banana plug to E3, and the Blue banana plug to E5.

(4) Connect the plug removed from the LOOP IN receptacle of the dummy box to J3.

(5) Connect the plug removed from the LOOP OUT receptacle of the dummy box to J7.

(6) Connect the free end of W28 or W30 (duplex) to the 24 VDC input.

(7) If AC only is used AC must be used to power the security equipment. A cable is necessary to connect the security equipment to the AC outlet.

(8) Set TT-98 OWR DX-SEND BLACK-RED switch in RED position (fig. 3-3).

(9) Perform modification and switch settings on TT-76A/GGC as outlined in TM 11-5815-338-15; lower the dust cover.

*e.* With the security equipment installed, readjust the teletypewriter range control, if necessary, to obtain clearly printed copy. Should the teletypewriter run open, or continue to misprint after the range control has been readjusted, higher echelon maintenance is required.

NOTE

If security equipment is installed in the shelter, similar equipment must be installed at the remote site. If security equipment is not installed at the remote site, the capability of encoding and decoding secure messages will be present at the shelter only.

**2-14. Removal of Dummy Box and Installation of Security Equipment AN/ GRC-142A, -142B, or AN/ GRC-122A, -122B Only (fig. 1-2)**

To install the security equipment if it is necessary to remove the dummy boxes. In the AN/GRC-142A, -142B, or AN/GRC-122A, -122B configurations, the upper right (curbside) dummy box is in the OWR DX-SEND loop, and the lower left (roadside) dummy box is in the DX-RECEIVE pony loop. Otherwise the removal procedures and instructions given in paragraph 2-13 are applicable. Set OWR DX-SEND switch in RED position (fig. 3-14).

## Section II. INITIAL ADJUSTMENT OF EQUIPMENT

NOTE

The procedures described in this section *cannot* be performed by the operator; they must be performed by maintenance personnel.

**2-15. Loop Current Adjustment**

*a.* Loop current is factory-adjusted and should not require readjustment. However, it must be checked after installation (and corrected if necessary) to insure proper teletypewriter operation. The loop current adjustment should also be checked when additional teletypewriter equipment is added to the loop. The procedure outlined below applies to either the OWR DX-SEND TTY loop or the DX-RECEIVE pony loop. (The DX-RECEIVE loop is used only during duplex or pony circuit operation.) The loop current adjustment procedure is based on the following conditions:

(1) Dc power is connected to the AN/GRC-142(*) or AN/GRC-122(*).

(2) All remote equipment (if used) is installed.

(3) All duplex equipment (AN/GRC-122(*) only) is installed. Security equipment not installed.

*b.* Perform the starting procedure that is applicable to the particular radio teletypewriter set configuration. Paragraph 3-6*a* through *i* for the AN/GRC-142 or AN/GRC-122 or paragraph 3-17*a* through *f* for the AN/GRC-142A, -142B or AN/GRC-122A, -122B.

*c.* Raise the TT-76A/GGC cover. Remove modification (resistor) and perform switch settings as outlined in TM 11-5815-338-15. See that its SIGNAL/BIAS switch is at 20 MA, and the SELECTOR MAGNET cable is plugged into the 20 MA connector; lower the dust cover.

*d.* Remove the TT-98/FG and the duplex TT-98/FG (AN/GRC-122(*) only) dust covers. Set the LINE SELECTOR switches at 20, rotate the LINE CURRENT INCREASE controls to midrange. Check switch box for DC Power setting; should be in OFF position. The Shorting Bar (between terminal 2 and 3) should not be strapped. Replace the dust cover.

*e.* Set the MD-522(*)/GRC METER FUNCTION switch to DC LOOP NO. 1 (OWR DX-SEND TTY loop) or DC LOOP NO. 2 (DX RCV/PONY loop, used in AN/GRC-122(*) only) as applicable.

*f.* Set the control panel LOOP ADJ OWR DX SEND control and LOOP ADJ DX RCV PONY control at midrange.

*g.* Observe current indication on MD-522(*)/GRC test meter. It should register 20 ma. If not, an adjustment (*h* through *o* below) in the MD-522(*)/GRC must be made.

NOTE

Loop battery modules (serial No. 1 through 200) do not contain these adjustments. On these models, set the battery module current selector switches (TM 11-5805-387-15-1) to position 3 and use the control panel LOOP ADJ OWR DX SEND and LOOP ADJ DX RCV PONY controls.

*h.* Set the MD-522(*)/GRC ON-OFF switch at OFF.

*i.* Remove all cables from the MD-522(*)/GRC.

*j.* Remove the MD-522(*)/GRC from its mounting and set it on one of the shelter sidewall working surfaces.

*k.* Remove the MD-522(*)/GRC from its weatherproof case by removing the Allen head bolts from around the front panel and pulling the chassis out.

*l.* Set the MD-522(*)/GRC, minus case, back on the mounting.

*m.* Reconnect all MD-522(*)/GRC cables as shown in the cording diagram for the applicable configuration (fig. 6-2 for the AN/GRC-142 or AN/GRC-122, or fig. 6-3 for the AN/GRC-142A, -142B or AN/GRC-122A, -122B).

*n.* Place the MD-522(*)/GRC ON-OFF switch at ON and allow a 5-minute warmup period.

*o.* Adjust the MD-522(*)/GRC loop battery supply module loop current 1 adjust or loop current 2 adjust for a 20-ma indication on the MD-522(*)/GRC test meter.

*p.* Place the MD-522(*)/GRC ON-OFF switch at OFF.

*q.* Restore the MD-522(*)/GRC to its original

mounting by performing procedures in *i* through *m* above in reverse order.

**2-16. Miscellaneous Adjustment**

*a.* Check the TT-76/GGC motor speed adjustment (TM 11-5815-238-12).

*b.* Check the TT-98/FG motor speed adjustment (TM 11-5815-200-12).

WARNING

1. Do not operate the shelter exhaust fan when the all fuel heater is operating. This will prevent deadly fumes from being drawn into the shelter.
2. In shelters where the AM-3349/GRC-106 vents cooling air to the outside of the shelter open the rear door louvers enough, when the all fuel heater is operating, to prevent deadly fumes from being drawn into the shelter.

*c.* If heat is required, check the shelter all fuel heater (space heater) needle valve adjustment (TM 5-4520-211-14 Hupp), or (TM 5-4520-236-14 (Hunter).

*d.* If the air conditioner (AN/GRC-142, serial numbers 1 through 697 only) is to be used, refer to the maintenance manual packed with the air conditioner.

**2-17. Ladder, Vehicle Boarding MX-3543/ G, Assembly**

(fig. 6-6)

A Ladder, Vehicle Boarding MX-3543/G assembly (boarding ladder) provides an easier access into a shelter by personnel when the shelter is vehicular mounted. If a trailer is attached to the vehicle it must be disconnected and moved out of the way before the boarding ladder can be installed. Place the boarding ladder bracket against the bottom frame of the door. The boarding ladder should now be leaning against the shelter at an angle which will be dependent upon the terrain. Fasten the hook on each of the two ropes of the boarding ladder to the towing rings, one on the bottom right, and one on the bottom left, rear corners of the shelter. Pull each of the two ropes through its guy fastener until the ropes become taut. (Tighten the ropes with hand pressure only.)

# Chapter 3
# INSTRUCTIONS

## Section I. GENERAL

### 3-1. General

This chapter provides operating instructions for the Radio Teletypewriter Sets AN/GRC-142, AN/GRC-142A, AN/GRC-142B and AN/GRC-122, AN/GRC-122A, AN/GRC-122B. The AN/GRC-142 or AN/GRC-122 controls, and the procedures required for operation under usual conditions are covered in sections I and II of this chapter. Sections III and IV cover the AN/GRC-142A, -142B or AN/GRC-122A, -122B. Section V (operation under unusual conditions), is applicable to all of the above radio teletypewriter set configurations.

### 3-2. Warnings and Cautions

**WARNING**

Dangerous voltages exist at the AM-3349/GRC-106 50 OHM LINE and WHIP antenna connectors. Be careful when working around the antenna or antenna connectors. Radiofrequency voltages as high as 10,000 volts exist at these points. Operator and maintenance personnel should be familiar with the requirements of TB SIG 291 before attempting operation or maintenance of the AN/GRC-106.

**NOTE**

This section covers only controls, indicators, and connectors used by the operator; items used by maintenance personnel are covered in instructions for the appropriate maintenance category.

**CAUTION 1**

Do not key the AN/GRC-106 until the tuning procedure (para 3-8) has been completed. Damage to the equipment may result. If the operating frequency is changed by a 10-megacycle (mc), 1-mc, or 100-kilocycle (kc) increment during operation, the equipment will automatically program to the new frequency and prevent the AM-3349/GRC-106 from being keyed until the TUNE-OPERATE switch is set to TUNE and then back to OPERATE. This serves as a reminder to the operator that the ANT TUNE and ANT LOAD controls must be readjusted to match the antenna to the AM-3349/GRC-106 each time the operating frequency is changed.

**CAUTION 2**

Do not place any items on the top of the AM-3349/GRC-106 that will in any way obstruct airflow through the heat exchanger. Overheating and damage to the equipment may result.

**CAUTION 3**

To prevent accidental RF transmission from the AM-3349/GRC-106, the C-434/GRC REMOTE switch must be at TEL ONLY when the ringing generator is operated.

## Section II. RADIO TELETYPEWRITER SET AN/GRC-142 OR AN/GRC-122, OPERATOR'S CONTROLS, INDICATORS, AND CONNECTORS

### 3-3. General

This section covers the AN/GRC-142 and AN/GRC-122 controls, connectors, and indicators that are not covered in other technical manuals. The chart below gives the units that are covered in existing technical manuals. It also lists the applicable technical manuals.

| *Unit* | *Technical manual* |
|---|---|
| AN/GRC–106 | TM 11–5820–520–12 |
| MD–522/GRC | TM 11–5805–387–15–1 |
| MD–522A/GRC | TM 11–5805–387–15–2 |
| TT–76A/GGC | TM 11–5815–238–12 |
| TT–98/FG | TM 11–5815–200–12 |
| TA–312/PT | TM 11–5805–201–12 |
| AN/GRA–6 | TM 11–5038 |
| Space heater | TM 5–4520–211–14 (Hupp) or TM 5–4520–236–14 (Hunter) |
| Air Conditoner model CE 6A–60 | Manual prepared by Redmanson Corporation. |
| Power Supply PP–4763(*)/GRC | TM 11–5820–765–12 |

## 3–4. Controls, Indicators, AND Connectors

*a. Power Panel, Controls and Indicators* (fig. 3–1).

**NOTE**

When operating in the ac only mode, the INVERTERS OWR ON–OFF and DX ON–OFF switches are not used.

| *Control or indicator* | *Function* |
|---|---|
| MAIN PUSH ON-PULL OFF circuit breaker | In the PUSH ON position, dc power is available to all dc powered equipment of the AN/GRC–142 or AN/GRC–122. When operating in ac only mode operate this circuit breaker to PULL OFF position to disconnect vehicle battery or external dc power source from shelter. |
| POWER lamp | Lights when the MAIN circuit breaker is pushed to indicate presence of dc power. |
| VDC meter | Monitors dc input voltage to the AN/GRC–142, or AN/GRC–122. |
| LIGHTS switch | In the ON position, the two shelter lamps will light, unless the blackout switch is open. |
| 5 AMP fuse (LIGHTS) | Provides protection for the lighting circuit. |
| BLOWER switch | Energizes shelter blower when at ON. |
| 10 AMP fuse (BLOWER) | Provides protection for the blower circuit. |
| LOCK-OUT switch | Used in conjunction with control panel LOCK-OUT–OVERRIDE switch to disable (in ON position) the lockout circuit when the AN/GRC–142 or AN/GRC–122 is set up to handle classified messages. |
| ½ AMP fuse (LOCK-OUT) | Provides protection for the lockout circuit. |
| 28V RECP switch | In the ON position, 28 volts dc is available at the dc receptacle shown in figure 1–3. |
| 5 AMP fuse (28V RECP) | Provides protection for the 28-volt dc receptacle circuit. |
| INVERTERS OWR ON-OFF switch | Energizes the inverter for the owr circuit when placed at ON. |
| 30 AMP fuse (INVERTERS OWR) | Provides protection for the owr inverter circuit. |
| INVERTERS DX ON–OFF switch (used for AN/GRC–122 only). | Energizes the duplex inverter (AN/GRC–122 only) when placed at ON. |
| 30 AMP fuse (INVERTERS DX) (used for AN/GRC–122 only). | Provides protection for the duplex inverter circuit. |

**NOTE**

All power panel fuseholders are the illuminating type and will glow to indicate a blown fuse.

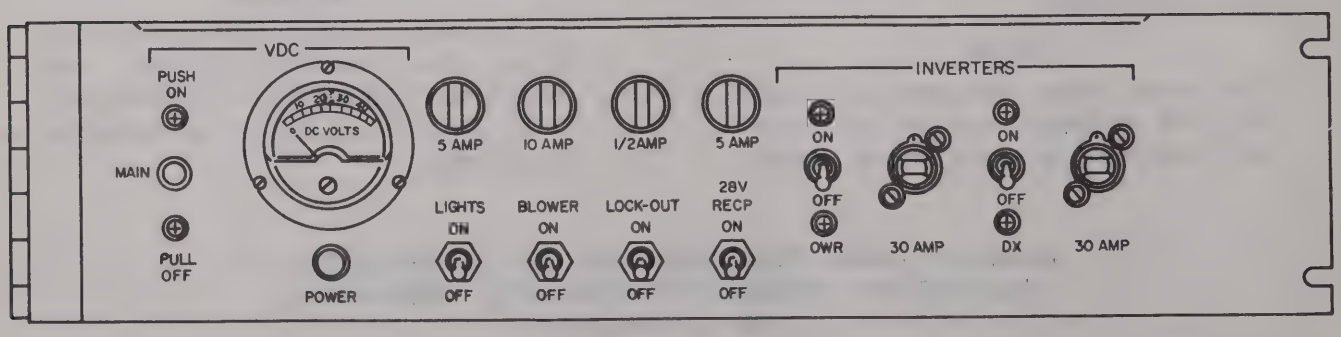



*Figure 3–1. Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122, power panel, controls and indicators.*

*b. Control Panel Controls, Indicators, and Connectors* (fig. 3–2).

| *Control or indicator* | *Function* |
|---|---|
| LOOP ADJ OWR DX SEND control | Permits operator to adjust OWR DX–SEND TTY loop current to desired level, as indicated on MD–522(*)/GRC test meter (METER FUNCTION switch at DC LOOP NO. 1). Clockwise rotation increases loop current. |
| LOOP ADJ DX RCV PONY control (used for AN/GRC–122 only). | Permits operator to adjust DX-RECEIVE pony loop current to desired level as indicated on MD–522(*)/GRC test meter (METER FUNCTION switch at DC LOOP NO. 2). Clockwise rotation increases loop current. (Used with AN/GRC–122 only.) |
| LOCAL–REMOTE switch | Enables or disables the remote teletypewriter operation.<br>*LOCAL position:* Remote teletypewriter operation is disabled.<br>*REMOTE position:* Remote teletypewriter operation is enabled. |
| LOCK-OUT–OVERRIDE switch (spring-loaded to return to LOCK-OUT when released). | Used in conjunction with the power panel LOCK-OUT switch to disable the lockout circuit when the AN/GRC–142 or AN/GRC–122 is set up to handle classified messages. Disabling the lockout circuit restores the TA–312/PT circuit to normal operation and allows remote voice operation. |
| | *Sw pos* — *Effect*<br>LOCK-OUT — Lockout circuit is enabled.<br>OVERRIDE — Lockout circuit is disabled. (Power panel LOCK-OUT switch must be at ON.) |
| AUDIO TEL CALL lamp | Operational only when security equipment is being used. Under this condition, lamp will flicker to indicate that remote operator is ringing local operator and desires that TA–312/PT circuit be returned to normal operation. |
| AUDIO TEL REMOTE–CW switch | Allows TA–312/PT lines to be used for telephone or remote cw operation. |
| | *Sw pos* — *Effect*<br>TEL — Establishes connection for telephone operation between shelter and remote site at which TA–312/PT is installed.<br>REMOTE CW — Permits remote TA–312/PT operator to transmit cw. (In this case, remote TA–312/PT is disconnected and KY–116/U connected in its place.) |
| AUDIO VOICE–KEY connector | Provides connection for M–29/U, H–33/PT, or KY–116/U to permit local voice, cw, or nsk plus voice operation as desired. |
| GRA–6 connector | Provides termination for Local Control C–434/GRC. |
| TTY LOOPS OWR DX SEND jack | Dummy box or security equipment is connected into the OWR DX SEND TTY loop at this jack. |
| TTY LOOPS DX RCV PONY jack (used for AN/GRC–122 only). | Dummy box or security equipment is connected into DX–RECEIVE pony loop at this jack. |

° This switch exists only in early models of the AN/GRC–142 and AN/GRC–122.

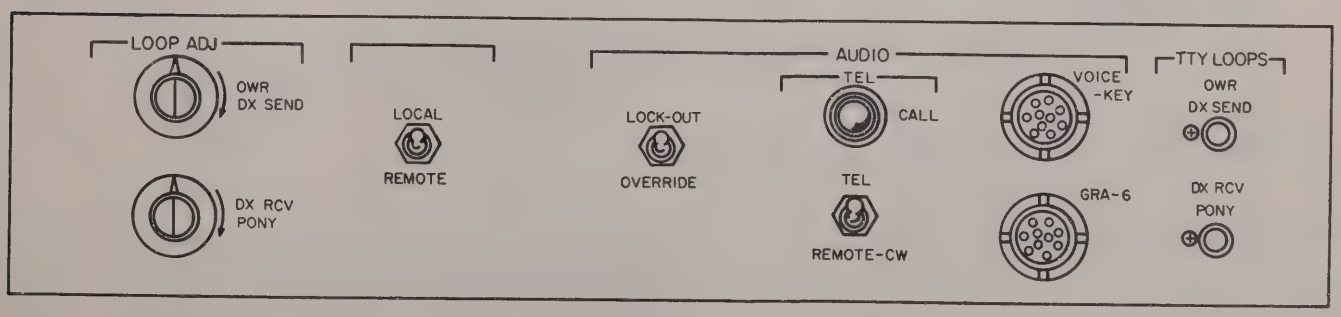



*Figure 3–2. Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122, control panel controls, indicators, and connectors.*

*c. Switchbox Controls* (fig. 3–3).

| *Control or indicator* | *Function* |
|---|---|
| TT–98 DX–RECEIVE PONY BLACK-RED switch (used for AN/GRC–122 only). | Enables operator to reduce DX–RECEIVE pony loop current through duplex TT–98/FG for use with security equipment. (This switch has an effect only in AN/GRC–122.) |
| | *Sw pos* — *Effect* |
| | BLACK — This is normal position and results in normal loop current (usually 20 ma.) |
| | RED — Reduces DX–RECEIVE pony loop current for use with security equipment. |
| TT–98 OWR DX–SEND BLACK-RED switch | Enables operator to reduce OWR DX–SEND TTY loop current through TT–98/FG for use with security equipment. |
| | *Sw pos* — *Effect* |
| | BLACK — This is normal position and results in normal loop current (usually 20 ma). |
| | RED — Causes reduction in OWR DC–SEND TTY loop current for use with security equipment. |
| TT–76 TAPE PUNCH OWR–DX–SEND–DX–RECEIVE switch. | Permits operator to switch TT–76A/GGC tape punch function between OWR DX–SEND and DX–RECEIVE pony loops. (This switch always must be in the OWR–DX–SEND position for AN/GRC–142.) |
| | *Sw pos* — *Effect* |
| | OWR–DX–SEND — Tape punch is connected into OWR–DX–SEND TTY loop. |
| | OWR DX–RECEIVE (this position used for AN/GRC–122 only). — Tape punch is connected into DX–RECEIVE poony loop. |

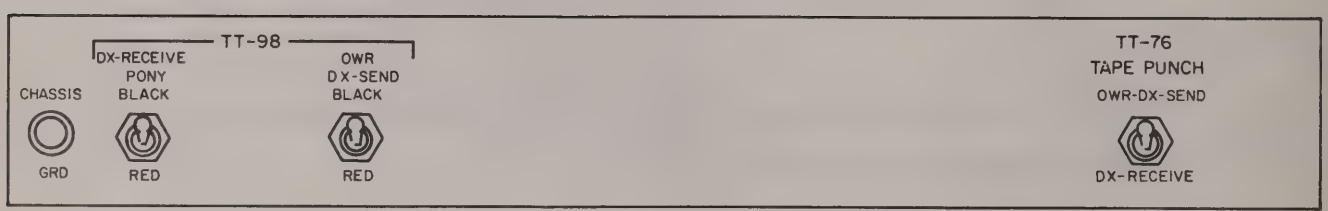



*Figure 3–3. Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122, switchbox, front panel controls.*

*d. Remote Box Control and Connectors* (fig. 3–4).

| *Control or indicator* | *Function* |
|---|---|
| Teletypewriter loop binding posts | Provide for termination of dc teletypewriter loop field wires originating at shelter dc entrance box binding posts. One pair is for OWR DX–SEND TTY loop, other pair is for DX–RECEIVE pony loop (used with AN/GRC–122 only). |
| Teletypewriter jacks | Provide means for connecting remote teletypewriters into dc teletypewriter loops. Six jacks are for OWR DX–SEND TTY loop, and six jacks are for DX–RECEIVE pony loop (used with AN/GRC–122 only). |

| *Control* | *Function* |
|---|---|
| AUDIO connector | Provides for termination of H-33/PT for remote voice or voice plus nsk operation. |
| SEND-RECRIVE switch | Permits remote keying of shelter AN/GRC-106. |
| SEND | AN/GRC-106 is keyed for teletypewriter or voice plus nsk transmission. |
| RECEIVE | AN/GRC-106 is not keyed and is in receive mode. |
| Pendant plug | Provides connection between remote box and Remote Control C-433/GRC (p/o AN/GRA-6). |

*e. Miscellaneous Control and Indicators* (figs. 3-5 and 3-6).

| *Control or indicator* | *Function* |
|---|---|
| TT-523/GGC switch | Used in conjunction with TT-76A/GGC SELECTOR switch to provide low-level current for punching or repunching tapes. This is done to reduce TT-76A/GGC radiation, and thereby provide secure conditions for handling classified messages. |

| *Sw pos* | *Effect* |
|---|---|
| TD SEND TR SEND/RCV. | Selected when TT-76A/GGC SELECTOR switch is set to position 1. Operation of TT-76A/GGC is not altered. |
| TD SEND LOCAL REPUNCH. | Selected when TT-76A/GGC SELECTOR switch is in position 2 or 3. Operation of TT-76A/GGC circuit is altered to opeate at reduced current. |

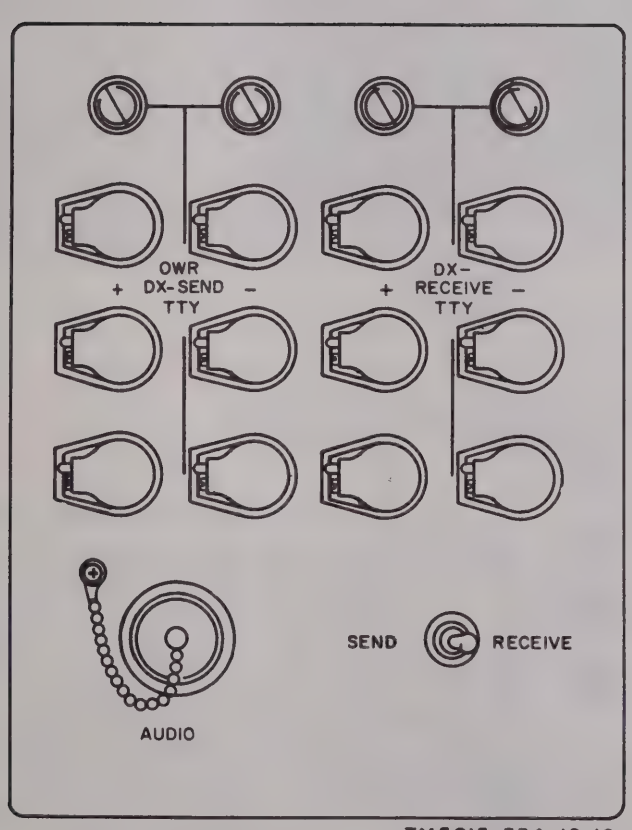



*Figure 3-4. Radio Teletypewriter Set AN/GRC-142(*) or AN/GRC-122(*), remote box, front panel control and connectors.*

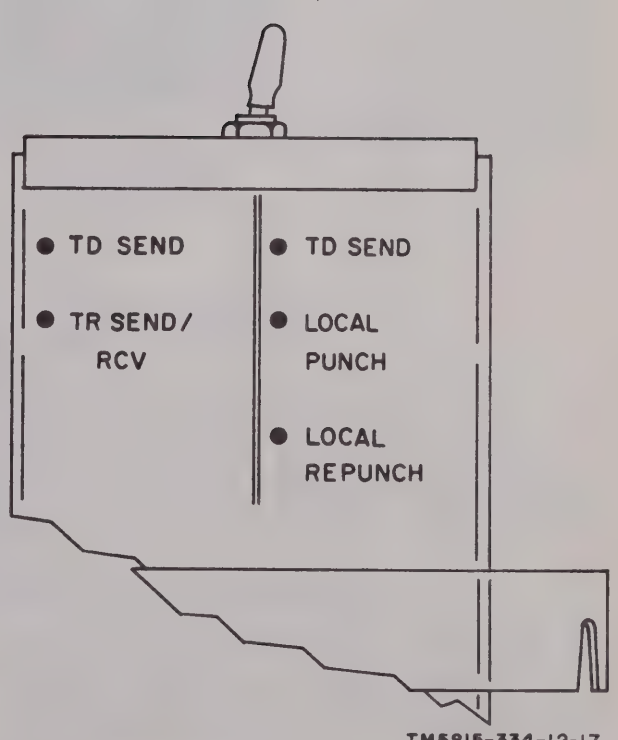



*Figure 3-5. Radiotypewriter Set AN/GRC-142(*) or AN/GRC-122(*), Low-Level Signaling Device TT-523/GGC, control.*

| | Sw pos | Effect |
|---|---|---|
| Air conditioner (AN/GRC-142, serial numbers 1 through 697 only) and 15-amp outlets ON-OFF circuit breaker. | | Controls power to air conditioner and 110-volt ac, 15-ampere convenience outlets. |
| 25 AMP OUT ON-OFF circuit breaker | | Controls power to 110-volt ac, 25-ampere outlet (fig. 1-1). |
| Distribution box AC POWER-DC POWER switch (fig. 3-8). | AC POWER | Shelter operates from external ac power source. |
| | DC POWER | Shelter operates from vehicle battery or external dc power source. |
| Ac entrance box AC INPUT connector (fig. 3-7) | | Provides connection to shelter ac circuits from external ac power source. |

*f. ME-165/G Controls, Indicators, and Connectors* (fig. 3-9).

| Control, indicator, or connector | | Function |
|---|---|---|
| Function switch | | Selects mode of operation for ME-165/G. |
| | *Sw pos* | *Effect* |
| | POWER | ME-165/G will measure power output of AM-3349/GRC-106. |
| | ADJUST | USED in conjunction with ADJUST control to calibrate meter for vswr measurement. |
| | SWR | Meter indicates vswr of antenna. |
| | OPERATE | Output of AM-3349/GRC-106 is routed directly to doublet antenna (AN/GRA-50, if installed). |
| ADJUST control | | Used in conjunction with function switch (ADJUST position) to calibrate meter for vswr measurement. |
| INPUT connector | | Output of AM-3349/GRC-106 is applied to this connector. |
| OUTPUT connector | | The RF output appearing at this connector is routed to doublet antenna (AN/GRA-50). |
| Meter | | Indicates AM/3349/GRC-106 average output power in watts, or vswr, depending on setting of function switch. |

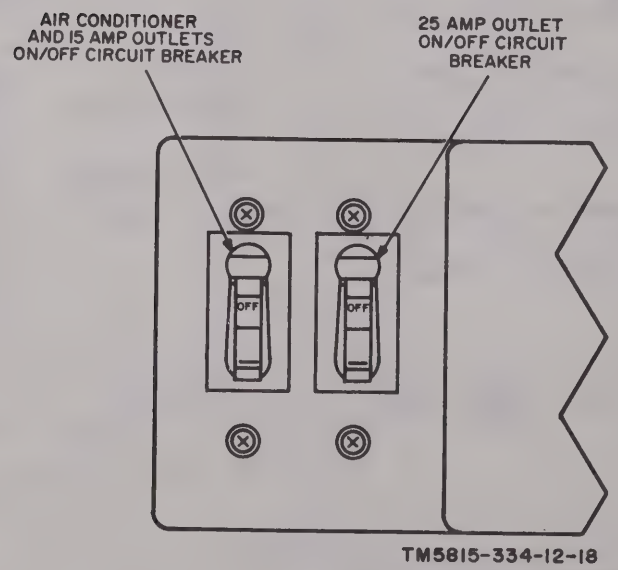



*Figure 3-6. Radio Teletypewriter Set AN/GRC-142 or AN/GRC-122, ac entrance box, controls (air conditioner exists only in AN/GRC-142, serial numbers 1 through 697).*

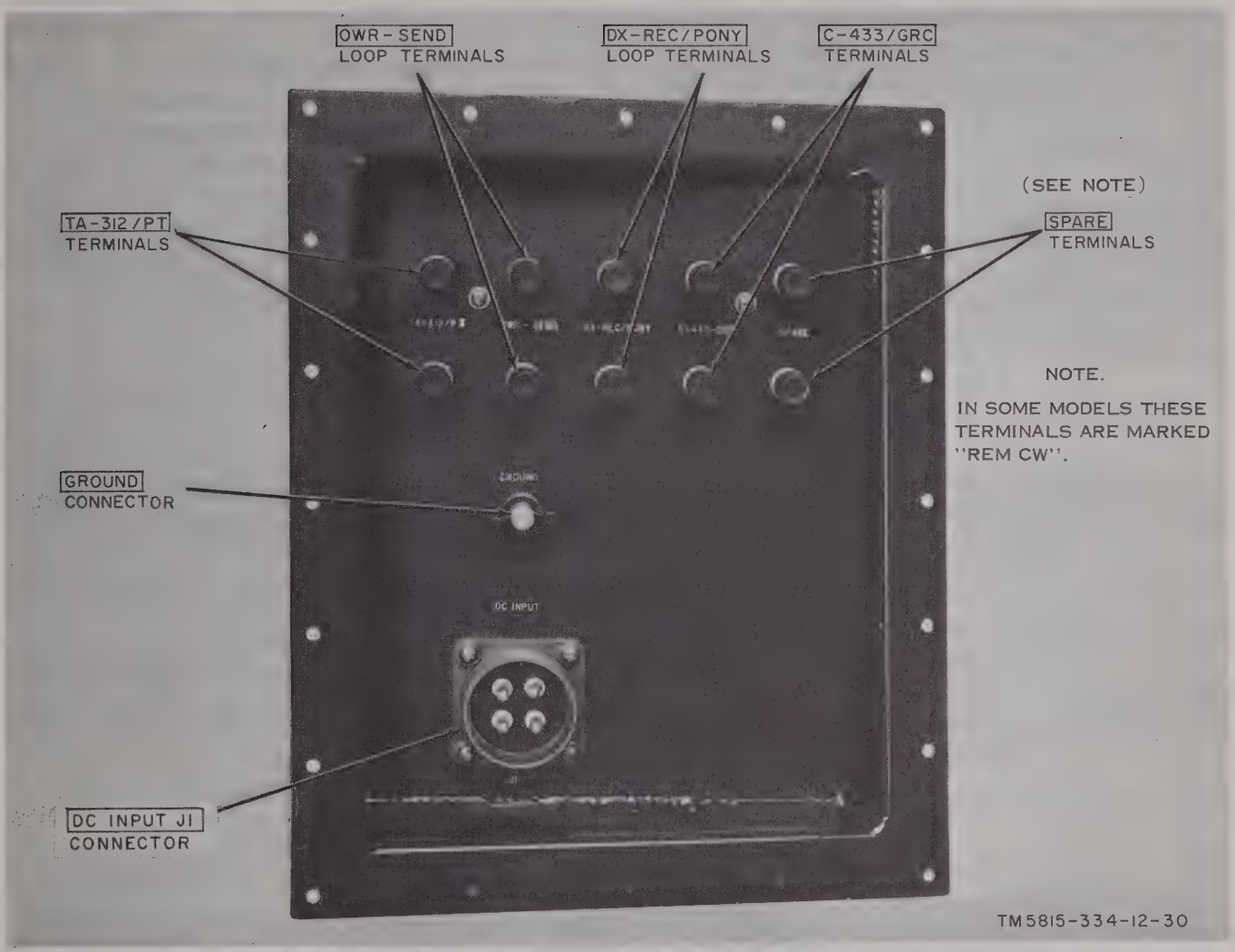



*Figure 3–10. Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122, dc entrance front panel connectors.*

## Section III. RADIO TELETYPEWRITER SET AN/GRC–142 or AN/GRC–122, OPERATION UNDER USUAL CONDITIONS

### 3–5. Types of Operation

Radio Teletypewriter Sets AN/GRC–142 and AN/GRC–122 may be operated either locally or remotely. Whether the AN/GRC–142 is operated locally or remotely, only one-way reversible (owr) operation is possible. The AN/GRC–122 provides duplex simultaneous transmission and reception) operation when operated either locally or remotely except when remote duplex voice operation of the AN/GRC–122 is not possible. To operate the AN/GRC–142 or AN/GRC–122, proceed as follows:

*a.* Starting procedure (para 3–6).

*b.* Tuning procedure (para 3–8).

*c.* The AN/GRC–142 and AN/GRC–122 have the following modes of operation. Select the appropriate procedure for the desired mode of operation.

(1) Owr reception, local (para 3–9).

(2) Owr transmission, local (para 3–10).

(3) Owr operation, remote (para 3–11).

(4) Duplex operation (AN/GRC–122 only, para 3–10).

(5) Pony (tty order wire) circuit operation (AN/GRC–122 only, para 3–11*e*).

*d.* Operation during radio silence, and output power measurement (para 3–7).

*e.* Stopping procedure (para 3–14).

## 3–6. Starting Procedure

After a complete shutdown or when starting the equipment for the first time, perform the starting procedures (*a* through *f* below) before attempting any mode of operation. When the equipment is in operation, preset only the applicable controls.

*a. Air Inlets and Outlets and Gasoline Can.*

(1) Open and latch the rear door (fig. 1–14) air inlet cover.

**WARNING**

When checking or filling the gasoline can, do not smoke or use an open flame in the vicinity. When filling the gasoline can, always provide a metal-to-metal contact between the fuel container and gasoline can before pouring the gasoline.

(2) If the heater is to be used, remove and secure the heater exhaust and inlet covers (figs. 1–8 and 1–14). Also check the fuel level in the gasoline can.

(3) Check to see that the air inlet and outlet filters are clean (para 4–9*h* and figs. 1–12 and 5–4).

**Caution**

Read the instructions in *c* below thoroughly before attempting to operate the lock or change its combination.

**NOTE**

A hasp-type combination padlock is substituted for the shelter door combination lock on all AN/GRC–142's bearing serial No. 294 and above on order No. DAAB–05–C–0137.

*b. Shelter Door Combination Lock* (figs. 1–14 and 3–11). The combination lock on the shelter door provides a means of locking the shelter. Turn the dial slowly and steadily. If a selected number is turned beyond the opening index mark, the entire combination of numbers must be redialed. *Do not* turn the dial back to regain the proper number alignment. Count 1 revolution each time a selected number is aligned with the opening index mark. Instructions for operating the lock and changing its combination are given in (1) through (4) below. Similar instructions are con-

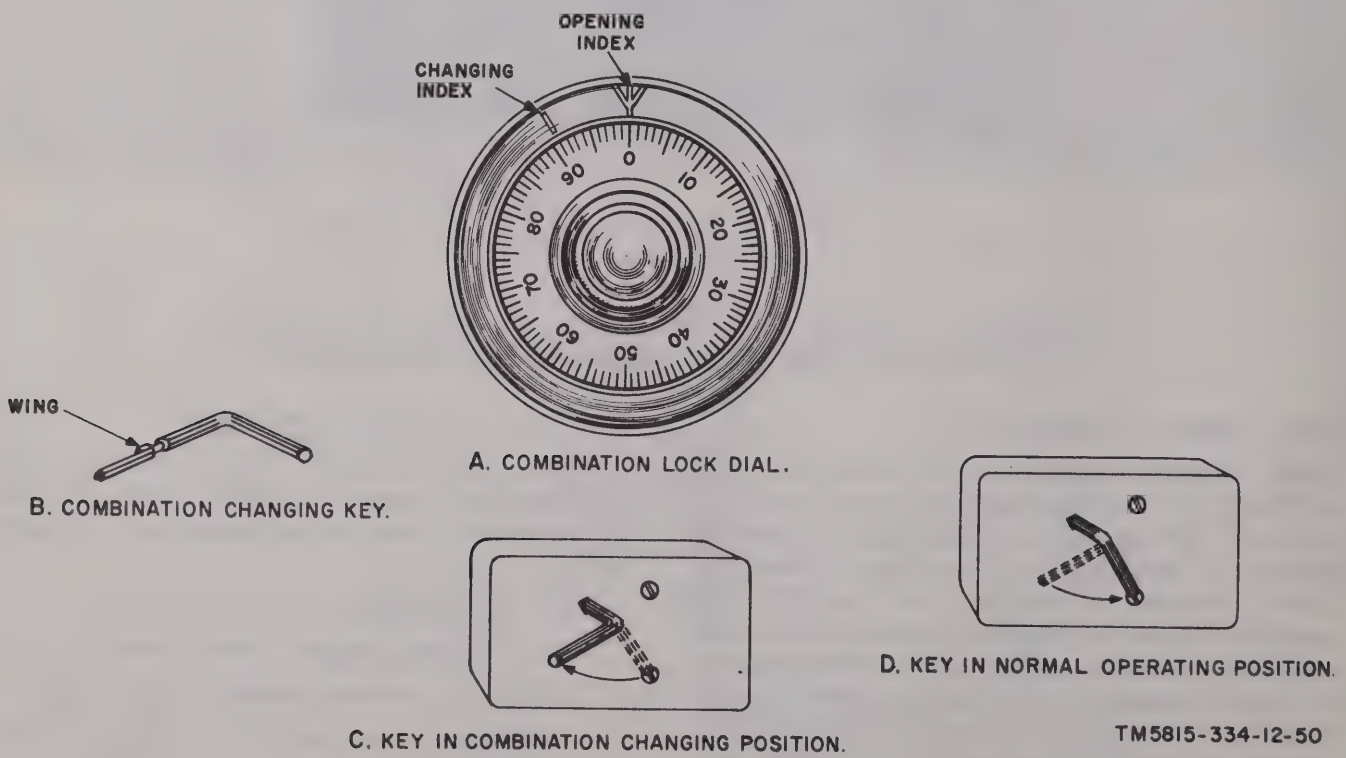



*Figure 3–11. Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122, shelter door combination lock, combination changing details.*

tained in a pouch on the shelter exterior near the shelter door.

(1) *To lock.* Rotate the dial clockwise at least 4 full revolutions.

(2) *To unlock on factory setting.* The combination of the lock is set at 50 when delivered from the factory. To unlock when the lock is set at 50, rotate the lock dial clockwise 4 full revolutions, stop when the dial number 50 is aligned with the opening index mark, and then turn the dial slowly counterclockwise until it stops.

(3) *To unlock on three-number combination.* To unlock on a three-number combination (*for example,* 28–76–34), rotate the dial clockwise and stop when the first number of the combination (28) is aligned with the opening index mark for the fourth time. Rotate the dial counterclockwise and stop when the second number of the combination (76) is aligned with the opening index mark for the third time. Rotate the dial clockwise and stop when the third number of the combination (34) is aligned with the opening index mark for the second time. Turn the dial slowly counterclockwise until it stops.

**CAUTION**

Be sure that the wing of the changing key ((4) below) is entirely within the body of the lock before turning the changing key.

(4) *Changing combination.* Select a new combination, using three numbers, *Do not* use a number between 0 and 20 for the last number of the combination. For maximum security, *do not* use numbers ending in 5 or 0 and *do not* use numbers in a rising or a falling sequence; *for example,* 35–50–75 is not as secure a combination as 54–38–72. Unlock the lock and open the shelter door ((2) or (3) above). Using the changing index mark, dial the existing combination. The lock leaves the factory with all numbers of the combination set at 50. When setting the combination for the first time, rotate the dial clockwise and stop when 50 is aligned with the changing index mark for the fourth time. Hold the dial with the last number of the combination at the changing index mark. Insert the changing key (stored in one of the shelter storage compartments) as far as it will go into the lock. Turn the changing key one-quarter turn clockwise. Turn the dial clockwise and stop when the first number of the new combination is aligned with the changing index mark for the fourth time. Turn the dial counterclockwise and stop when the second number of the new combination is aligned with the changing index mark for the third time. Turn the dial clockwise and stop when the third number of the new combination is aligned with the changing index mark for the second time. Holding the dial in this position, turn the changing key counterclockwise one-quarter turn to the operation position. The lock is now set up for the new combination. If the lock does not operate after the combination has been changed, higher category of maintenance is required.

**CAUTION**

Before closing the shelter door and operating the lock, try the new combination several times, using the opening index mark.

*c. Whip or Doublet Antennas and Ground Rods.*

(1) Check to see that the whip antennas (para 2–8) are in operating position, properly connected, and free of obstruction.

(2) If doublet antennas are used, check to see that they are properly constructed (TM 11–5820–467–15) and connected.

(3) Check installation of ground rods (para 2–7).

*d. Truck Exhaust Pipe Hose* (fig. 1–9). The truck exhaust pipe hose is a flexible steel hose. It is used when the shelter is truck-mounted and is being operated at halt. Slide the truck exhaust pipe hose onto the truck exhaust pipe for approximately 12 inches.

**WARNING**

After continued truck operation, the hose becomes very hot, especially where it overlays the truck exhaust pipe. DON'T GET BURNED!

*e. Heater Exhaust Hose* (fig. 1–18). The heater exhaust hose is used when the shelter is being used at halt and heat is required in the shelter.

(1) Remove the heater exhaust opening cover (fig. 1–8) by releasing the four fasteners.

(2) Place the flange end of the heater exhaust hose against the heater exhaust opening.

(3) Twist each of the four flange fasteners to secure the hose flange to the heater exhaust opening.

*f. Teletypewriter Slides* (fig. 1–10). The

TT-76/GGC, TT-98/FG, and the duplex TT-98/FG (AN/GRC-122 only) are all slide-mounted. They can be stored out of the way when not in use. The procedure for storing the teletypewriter equipment is given in (1), (2), and (3) below. Reverse the procedure to place the teletypewriter equipment in operation.

(1) *TT-76/GGC.* Remove the two guide pins from the slides of the TT-76/GGC mounting plate and push it as far as it will go toward the front of the shelter. Reinsert the two guide pins.

(2) *TT-98/FG.* Loosen the two guide clamps of the TT-98/FG mounting plate and push it as far as it will go toward the front of the shelter. Tighten the two guide clamps.

(3) *Duplex TT-98/FG (AN/GRC-122 only).* Remove the two guide pins from the slides of the duplex TT-98/FG mounting plate and push it as far as it will go toward the front of the shelter. Reinsert the two guide pins.

*g. Power Sources.*

(1) When using the vehicle power source, set the distribution box AC POWER-DC POWER switch to DC POWER, set the vehicle throttle for a 28-volt output from the vehicle generator as indicated by the AN/GRC-142 or AN/GRC-122 power panel meter.

(2) When using an external dc power source, the power source must have a 100-ampere, 28-volt dc capability with less than 1 percent ripple and better than 2 percent regulation.

(3) For remote teletypewriter operation, a 2-ampere, 115-volt ac, 60-Hz power source is required at the remote site for each teletypewriter.

(4) Operation of the air conditioner and other ac circuits within the shelter requires an external ac source capable of supplying 110 volts, 60 amperes, 60 Hz.

*h. Preset Chart.* Before attempting any mode of operation, preset the controls of the AN/GRC-142 or AN/GRC-122 as given in the chart below. After presetting the equipment controls, perform the tuning procedure (para 3-8). If operating from an ac source only (no dc), set the distribution box AC POWER-DC POWER switch to AC POWER. Set the PP-4763(*)/GRC ON-OFF switch to ON. Place both ac entrance box circuit breakers to ON. This mode of operation requires an ac power source capable of supplying 115 volts ac, 60 Hz at 75 amperes.

**NOTE 1**

To conserve vehicle battery power, it may be desirable to use the ac only mode even though the shelter is connected to the vehicle battery. Under this condition, pull the power panel MAIN circuit breaker to disconnect the vehicle battery from the shelter power system.

**NOTE 2**

Under certain operating conditions, the power panel MAIN circuit breaker may kick out when all the shelter components are being energized at the same time. (This condition will be most noticeable during full-duplex operation when larger starting currents will be present.) To alleviate this condition, power should be applied to the components listed in the preset chart below in the following sequence:

(1) Turn all components off.

(2) Push MAIN circuit breaker on power panel (fig. 3-1).

(3) Set power panel LIGHTS switch to ON.

(4) Set power panel INVERTERS OWR switch to ON.

(5) Set power panel INVERTERS DX switch (AN/GRC-122 only) to ON.

(6) Turn on remainder of equipment as instructed in the applicable operating procedures and the following chart:

| Step | Unit | Control or switch position |
|---|---|---|
| 1 | Power panel (fig. 3-1)---- | MAIN PUSH ON-PULL OFF circuit breaker: Push.<br>LIGHTS switch: ON. (In order for the lights to work with the shelter door open, the *blackout* switch (fig. 1-3 or 1-4) must be pulled out.)<br>Meter: Adjust vehicle throttle for a 28-volt indication. This voltage must be maintained for all modes of operation. Energizing units of the AN/GRC-142 or AN/GRC-122 may cause this voltage to drop. If so, readjust the vehicle throttle as necessary to maintain the 28-volt indication. If operating in the ac only mode, a low 28-volt dc reading indicates a low ac input to the shelter. Check with ac power meter on curbside shelter wall for a 110-volt ac indication. Refer to applicable technical manual if an external power supply is used. |

| Step | Unit | Control or switch position |
|---|---|---|
| | | BLOWER switch: Turn to ON as required. Blower does not operate in ac only mode. |
| | | LOCK-OUT switch: ON |
| | | INVERTERS OWR ON-OFF switch: OFF |
| | | INVERTERS DX ON-OFF switch: OFF (used with AN/GRC-122 only). |
| 2 | Control panel (fig. 3-2) | LOOP ADJ OWR DX SEND control: Midrange. |
| | | LOOP ADJ DX RCV PONY control: Midrange (AN/GRC-122 only). |
| | | LOCAL-REMOTE switch: LOCAL |
| | | LOCK-OUT-OVERRIDE switch: LOCK-OUT. |
| | | AUDIO TEL REMOTE-CW switch (early models only): AUDIO TEL. |
| 3 | Switchbox (fig. 3-3) | TT-98 DX-RECEIVE PONY BLACK-RED switch: BLACK (AN/GRC-122 only). |
| | | TT-98 OWR DX-SEND BLACK-RED switch: BLACK |
| | | TT-76 TAPE PUNCH OWR-DX-SEND—DX-RECEIVE switch: OWR-DX-SEND. |
| 4 | Remote box (fig. 3-4) | SEND-RECEIVE switch: RECEIVE. |
| 5 | TT-523/GGC (fig. 3-5) | TT-523/GGC switch: TD SEND-TR SEND/RCV. |
| 6 | RT-662/GRC and duplex RT-662/GRC (AN/GRC-122 only) (TM 11-5820-520-12). References to RT-662/GRC are also applicable to RT-834/GRC. | SERVICE SELECTOR switch: OVEN ON. (Allow a minimum of 10 minutes warm-up time to stabilize equipment). Set VOX switch to PUSH -TO-TALK. Turn SQUELCH control to OFF. Set NOISE BLANKER switch to OFF. (Used on older RT-662/GRC only). Set BFO control to mid-range. Set MANUAL RF GAIN control fully clockwise. Set AUDIO GAIN control to mid-range. Set FREQUENCY VERNIER to OFF. |
| 7 | AM-3349/GRC-106 | Set HV RESET switch to OPERATE. Set PRIM PWR switch to OFF. |
| 8 | TT-98/FG and duplex TT-98/FG (AN/GRC-122 only) (TM 11-5815-200-12). | MOTOR switch: OFF. |
| | | LIGHT switch: OFF. |
| | | LINE-BREAK switch: LINE. |
| | | SEND-LOCK switch: SEND. |
| 9 | TT-76A/GGC (TM 11-5815-238-12) | POWER switch: OFF. |
| | | MOTOR switch: OFF. |
| | | LIGHT switch: OFF. |
| | | KEYBOARD switch: SEND. |
| | | SELECTOR switch: 1. |
| | | START-STOP-FEED RETRACT lever: FEED RETRACT. |
| | | RCV-SEND switch: RCV. |
| 10 | MD-522(*)/GRC (TM 11-5805-387-15-1) or TM 11-5805-387-15-2). | AUDIO GAIN control: Midrange. |
| | | ONE WAY-DUPLEX switch: ONE WAY. |
| | | MODE SELECTOR switch: VOICE. |
| | | RECEIVE-REV-NORM switch: NORM. |
| | | METER FUNCTION switch: REGULATED DC. |
| | | SCOPE INTENSITY control: Midrange. |
| | | DC LOOP NO. 1 switch [b]: 20MA. |
| | | DC LOOP NO. 2 switch [b]: 20MA. |
| | | AUTO MARK/HOLD switch [b]: ON. |
| | | ON-OFF switch [b]: ON. |
| 11 | LS-166/U and duplex LS-166/U (AN/GRC-122 only). | VEHICLE-PACKSET switch: VEHICLE. |

| Step | Unit | Control or switch position |
|---|---|---|
| 12 | C-434/GRC (TM-11-5038) | REMOTE switch (if operating remote): TEL ONLY. |
| 13 | TA-312/PT (TM 11-5805-201-12) | Selector switch: LB.<br>INT-EXT switch: INT.<br>LOUD control: Fully clockwise. |
| 14 | C-433/GRC (TM 11-5038) | SELECTOR switch: TEL. |
| 15 | ME-165/G [c] (fig. 3-9) | Function switch: POWER. |
| 16 | Heater | ON-OFF switch: OFF. |
| 17 | Air conditioner (fig. 1-2) (AN/GRC-142, serial numbers 1 through 697 only). | SW 1: 0; SW 2: OFF; SW 3: VENT; SW 4: Midrange |
| 18 | Ac entrance box [d] (fig. 3-6) | Both circuit breakers OFF. |

[a] Some models of the RT-662/GRC do not contain the NOISE BLANKER switch.
[b] These front panel controls exist only on the MD 522A/GRC models.
[c] Do not key the AN/GRC-106 (with full power output) for more than 10 minutes at a time with the ME-165/G function switch at POWER.
[d] When operating in the ac only mode, set both circuit breakers to ON, and the distribution box AC POWER-DC POWER switch at AC.

*i. MD-522(*)/GRC Regulated DC Check.* See that the MD-522(*)/GRC is receiving 28 volts dc by placing the MD-522(*)/GRC METER FUNCTION switch to REGULATED DC. An indication of 20 volts dc should be observed on the meter. If not, corrective maintenance is required.

**NOTE**

If remote teletypewriters are being used, set the control panel LOCAL-REMOTE switch to REMOTE before performing the loop current adjustments (*j* and *k* below).

*j. OWR DX-SEND TTY Loop Current Adjustment.*

(1) Set the MD-522(*)/GRC METER FUNCTION switch at DC LOOP NO. 1.

(2) Rotate the control panel LOOP ADJ OWR DX SEND control for a 20-ma indication on the MD-522(*)/GRC meter. (Control may not have any effect. Disregard as long as current indication is 20 ma).

*k. DX-RECEIVE Pony Loop Current Adjustment* (AN/GRC-122 ONLY).

(1) Set the MD-522(*)/GRC METER FUNCTION switch at DC LOOP NO. 2.

(2) Rotate control panel LOOP ADJ DX RCV PONY control for a 20-ma indication on the MD-522A/GRC meter. (Control may not have any effect. Disregard as long as current indication is 20 ma.)

## 3-7. Operation During Radio Silence, and Output Power Measurement

If the AN/GRC-142 or AN/GRC-122 is to be set up for a particular mode of operation during radio silence, the following procedures apply. These procedures may also be used if the daily preventive maintenance checks and services are to be done during a period of radio silence. In addition, power output (AM-3349/GRC-106) can also be measured using these procedures. The procedures are divided into two areas: operation with doublet antenna and operation with whip antenna. They are to be performed in conjunction with the starting procedure (para 3-6) and the tuning procedure (para 3-8).

*a. Operation With Doublet Antenna.*

(1) Perform applicable portions of starting procedure (para 3-6).

(2) Set the ME-165/G function switch to POWER.

(3) Perform the tuning procedure (para 3-8). If maintaining radio silence, disregard instructions to change the setting of ME-165/G function switch from the POWER position. (Voltage standing wave ratio (vswr) measurements cannot be made during radio silence.)

(4) Perform desired mode of operation (para 3-9 or 3-11).

(5) Power meter (ME-165/G) indications should be as follows for the various modes of operation. (These are average power readings.)

| | | |
|---|---|---|
| (*a*) | Cw | approx 200 watts. |
| (*b*) | Ssb voice | approx 200 watts. |
| (*c*) | Compatible am | approx 100 watts. |
| (*d*) | Fsk, or voice +nsk | approx 200 watts. |
| (*e*) | Nsk | approx 100 watts. |

*b.* Operation in Whip Antenna Mode.

(1) Perform applicable portions of starting procedure (para 3-6).

(2) See that the AM-3349/GRC-106 PRIM PWR switch is at OFF.

(3) Set the ME-165/G function switch to

POWER. Do not change setting of this switch. Doing so will remove the load from the transmitter and may result in component damage.

NOTE

When the CG-2568A/U (5 ft, 6 in.) is connected ((4) below), the whip antenna is automatically disconnected.

(4) Connect the CG-2568A/U (5 ft, 6 in.) to the AM-3349/GRC-106 50 OHM LINE connector.

(5) Perform the tuning procedure (para 3-8) for the whip antenna. Disregard any reference to the ME-165/G and the doublet antenna.

(6) Perform desired mode of operation (para 3-9 or 3-11).

(7) Power meter (ME-165/G) indications should be as follows for the various modes of operation. (These are average power readings.)

| | |
|---|---|
| (a) Cw ..... | approx 200 watts. |
| (b) Ssb voice .... | approx 200 watts (varies with voice input). |
| (c) Compatible am | approx 100 watts (varies with voice input). |
| (d) FSK, or voice +nsk | approx 200 watts. |
| (e) Nsk ..... | approx 100 watts. |

(8) Set AM-3349/GRC PRIM PWR switch to OFF.

(9) Disconnect cable CG-2568A/U from the AM-3349/GRC-106 50 OHM LINE connector.

(10) Before attempting to transmit, the radio will have to be tuned (para 3-8).

**3-8. Tuning Procedure**

This tuning procedure outlines the steps to be performed when tuning the transmitter (AN/GRC-106). The steps to be performed for transmitter tuning when using a whip antenna are altered slightly when using the doublet (AN/GRA-50) antenna. Perform the starting procedures (para 3-6) before attempting to perform this tuning procedure.

CAUTION 1

Do not key the AN/GRC-106 while performing the procedures in *a* through *g* below.

CAUTION 2

If a doublet antenna (AN/GRA-50) is connected to the AM-3349/GRC-106, the tuning procedure requires the use of the ME-165/G. Under this condition, full transmitter power must not be applied to the ME-165/G for longer than 15 minutes. (Transmitter tune power is applied when the HV RESET switch is at TUNE. Full transmitter power is applied when the HV RESET switch is at OPERATE, the AN/GRC-106 is keyed, and modulation is applied to the RT-662/GRC.) Failure to observe this time limit will cause excessive heat to be generated within the ME-165/G cabinet, causing component damage and possible personal injury. When the ME-165/G function switch is at OPERATE, the ME-165/G is not in use, as the AM-3349/GRC-106 signal is fed straight through to the doublet antenna.

CAUTION 3

If the duplex RT-662/GRC (AN/GRC-122 only) is installed in the shelter, the receiving frequency of the auxiliary receiver *must differ* from the transmitting frequency by at least 10 percent or 1 MHz, whichever is greater. This applies even though the duplex RT-662/GRC may not be turned on. Always tune the duplex RT-662/GRC before the AN/GRC-106 is keyed.

NOTE

If a doublet antenna (AN/GRA-50) is connected to the AM-3349/GRC-106, set the ME-165/G function switch to POWER.

*a.* Set the RT-662/GRC SERVICE SELECTOR switch to STANDBY and the AM-3349/GRC-106 PRIM PWR switch to ON, and allow 90 seconds for warmup of AM-3349/GRC-106. Observe that the amplifier blowers are energized and that the signal level meter indicates in the extreme right portion of the meter scale. (If above indications are abnormal, refer to table 4-2, items 1 and 2, TM 11-5820-520-12.)

*b.* Set the RT-662/GRC SERVICE SELECTOR switch to SSB-NSK (or any operate mode FSK, AM, or CW). Signal level meter will return to extreme left portion of meter scale.

*c.* Set the AM-3349/GRC-106 TEST METER switch to PRIMARY VOLT. Observe that the test meter pointer indicates within the area of the two dark green wedges (top scale) when the service selector switch is in the SSB-NSK, FSK, AM, or CW positions. (If the above indication is abnormal, refer to table 4-2, item 3, TM 11-5820-520-12).

*d.* Set the AM-3349/GRC-106 TEST METER switch to POWER OUT.

*e.* Turn the RT-662/GRC MHz and KHz controls to operating frequency. The frequency

digits are displayed in the windows directly above the controls.

*f.* Determine the AM-3349/GRC-106 start settings for ANT TUNE and ANT LOAD counter from the antenna tuning and logging chart according to the selected operating frequency and type of antenna being used.

*g.* Adjust the AM-3349/GGC-106 ANT TUNE control until the ANT TUNE counter indicates the setting determined in *f* above.

*h.* Adjust the AM-3349/GRC-106 ANT LOAD control until the ANT LOAD counter indicates the setting determined in *f* above.

CAUTION

Be sure the antenna is attached for proper loading to prevent damage to the equipment while performing *i* through *p* below.

NOTES

1. The HV RESET switch should not stay in TUNE position for more than two minutes. If more than two minutes are required, move the HV RESET switch to the OPERATE position, and the SERVICE SELECTOR switch to STANDBY for a 5 minute cooling, and then proceed with the tuning procedures.
2. The ANT TUNE and ANT LOAD controls will interact with each other. To center their respective meter pointers, rotate them slowly in the direction opposite to that of the indicated error.

*i.* Set AM-3349/GRC-106 HV RESET switch to TUNE. Wait for a deflection on the ANT TUNE and ANT LOAD meters.

*j.* Adjust the AM-3349/GRC-106 ANT LOAD control for a center scale reading on the ANT LOAD meter.

(1) Rotate control in the direction that the meter pointer is to move. Adjust the ANT TUNE control for a center scale reading on the ANT TUNE meter.

(2) Rotate control in the direction that the meter pointer is to move, keeping the ANT LOAD meter as close to center scale as possible.

(3) Tuning of the amplifier is complete when simultaneous center scale readings are obtained on the ANT TUNE and ANT LOAD meters. TEST METER pointer indicates just below gray portion of scale. (If indication is abnormal refer to table 4-2, item 6, TM 11-5820-520-12.)

*k.* Set the AM-3349/GRC-106 TEST METER switch to LOW VOLT. Test meter pointer indicates within green portion area of top scale. (If indication is abnormal, refer to table 4-2, item 4, TM 11-5820-520-12.)

*l.* Set the AM-3349/GRC-106 TEST METER switch to HIGH VOLT. TEST METER pointer indicates within green portion area of top scale. (If indication is abnormal, refer to table 4-2, item 5, TM 11-5820-520-12.)

*m.* Set the AM-3349/GRC-106 TEST METER switch to DRIVER CUR. TEST METER pointer indicates within the two dark green wedges of top scale. (If indication is abnormal, refer to table 4-2, item 7, TM 11-5820-520-12.)

*n.* Set the AM-3349/GRC-106 TEST METER switch to GRID DRIVE. TEST METER pointer indicates just below (to the left of) gray portion of the bottom scale. (If indication is abnormal, refer to table 4-2, item 7, TM 11-5820-520-12.)

*o.* Set the AM-3349/GRC-106 TEST METER switch to PA CUR. TEST METER pointer indicates just below (to the left of) the gray portion of the bottom scale. (If indication is abnormal refer to table 4-2, item 7, TM 11-5820-520-12.)

*p.* Turn the AM-3349/GRC-106 TEST METER switch to POWER OUT. TEST METER pointer indicates just below (to the left of) gray area of scale. (If indication is abnormal, refer to table 4-2, item 7, TM 11-5820-520-12.)

CAUTION

The HV RESET switch should not stay in TUNE position for more than two minutes.

*g.* Turn the AM-3349/GRC-106 HV RESET switch to OPERATE.

NOTES

1. ANT TUNE and ANT LOAD counter settings should be logged in the logging chart with a pencil after *q* above as been completed. These settings may be used for future tuning references unless ANT TUNE and ANT LOAD meter pointers indicates in the red (left or right of center scale) portion of the scale during operation. If the settings cannot be used, repeat tuning procedure *e* through *q* above.
2. The AN/GRC-106 is now properly tuned for any mode of operation using the whip antenna. To conserve power, when receiving only, the AM-3349/GRC-106 PRIM PWR switch should be set at OFF. To resume operation, turn the AM-3349/GRC-106 PRIM PWR switch to ON and the HV RESET switch to TUNE. Allow a 60-second delay, and then turn the HV RESET switch to

OPERATE. The AN/GRC-106 is now ready for operation.

*r.* Proceed with the steps in *s* through *ae* below only if the doublet antenna (AN/GRC-50) is connected to the AM-3349/GRC-106.

*s.* Set the RT-662/GRC SERVICE SELECTOR switch to CW.

*t.* Set the MD-522(*)/GRC RCV SEND switch to SEND.

*u.* Observe the indication on the ME-165/G meter. It should indicate 200 watts ± 10 percent.

*v.* Set the MD-522(*)/GRC RECEIVE-SEND switch to RECEIVE.

*w.* Set the HV RESET switch on AM-3349/GRC-106 to tune.

*x.* Set the ME-165/G function switch to OPERATE.

*y.* Readjust the ANT TUNE and ANT LOAD controls so that the ANT TUNE and ANT LOAD meter pointers indicate in the green (center) portions of the scales.

*z.* Turn the HV RESET switch on AM-3349/GRC-106 to OPERATE.

*aa.* Set the MD-522(*)/GRC RECEIVE-SEND switch to SEND.

*ab.* Turn the ME-165/G function switch to ADJUST.

*ac.* Adjust the ME-165/G ADJUST potentiometer for a full-scale deflection on the ME-165/G. Function switch should not be left at ADJUST any longer than it takes to make the adjustment.

*ad.* See that the indication on the lower scale of the ME-165/G meter is in the green area. (The green area indicates an acceptable voltage standing wave ratio (vswr). This ratio should not exceed 2:1.)

*ae.* Set the ME-165/G function switch to OPERATE.

*af.* Log the ANT TUNE and ANT LOAD counter settings onto the LOGGING CHART after the procedures above have been completed. These settings may be used for future tuning reference unless the ANT TUNE or ANT LOAD meter indicates in the red portion of the scale during operation.

NOTE

The AM-3349/GRC-106 is now properly tuned for any mode of operation, using the doublet antenna. To conserve power, when receiving only, the AM-3349/GRC-106 PRIM PWR switch should be set at OFF. To resume operation, set the AM-3349/GRC-106 PRIM PWR switch to ON and the TUNE-OPERATE switch to TUNE. Allow a 60-second delay and then set the TUNE-OPERATE switch to OPERATE. The AN/GRC-106 is now ready for operation.

### 3-9. Local Owr Operation

Perform the starting procedure (para 3-6) and the tuning procedure (para 3-8) before attempting any mode of local owr operation. Perform the operating procedure (*a* or *b* below) applicable to the mode of local owr operation selected.

NOTE 1

If the noise level is undesirable in the absence of received signals, set the RT-662/GRC SQUELCH switch to ON. In the cw and fsk modes of operation, the squelch is automatically disabled. When operating the MD-522(*)/GRC in the nsk code of operation, the RT-662/GRC SQUELCH switch should be set at OFF. In the am. or ssb mode of operation, with the SQUELCH switch set at ON, the audio output is not completely squelched with high noise levels. A low level of audio is always present to indicate that the receiver portion of the RT-662/GRC is operating.

NOTE 2

The RT-662/GRC MANUAL RF GAIN control setting should not be altered unless the RT-662/GRC is being operated in close proximity (10 miles or less) with another radio set. The MANUAL RF GAIN control can then be rotated to some counterclockwise position that provides an indication on the signal level meter that is roughly one or two divisions below the full level indication of the received signal strength. This will reduce background noise and minimize adjacent channel interference when not receiving a signal. Rotating the MANUAL RF GAIN control counter-clockwise desensitizes the RT-662/GRC. Therefore, if the operating frequency or location is changed, the MANUAL RF GAIN control should be returned to its maximum clockwise position to insure that the signals are not lost. The MANUAL RF GAIN is not usually used when operating in a net.

NOTE 3

In the cw mode, the transmitted RF signal is 2 kc higher than the frequency indicated by the RT-662/GRC MC and KC controls.

NOTE 4

Some models of the RT-662/GRC do not contain the NOISE BLANKER switch.

NOTE 5

If ignition-type (pulse) noise is heard in the received signal, set the NOISE BLANKER switch at ON. A 1-second automatic gain control (agc) delay occurs when the NOISE BLANKER switch is set to ON before the noise blanker circuit becomes effective. If noise blanking is not required, set the NOISE BLANKER switch to OFF.

NOTE 6

The MD-522A/GRC automatic markhold circuit automatically switches the teletypewriter into standby (mark-hold condition) when the noise on the incoming radio signal becomes so great that no meaningful information can be received. This circuit is energized by setting the MD-522A/GRC MARK-HOLD switch to ON.

NOTE 7

The MD-522(*)/GRC squelch circuit disables the monitor speaker (connected to SPEAKER + REMOTE connector) when the noise on the incoming radio signal becomes so great that no meaningful information can be received. Squelch level is controlled by the setting of the SQUELCH SENS control.

NOTE 8

The audio output level of the RT-662/GRC must be maintained within certain limits to insure proper MD-522(*)/GRC operation. This level is indicated on the MD-522(*)/GRC meter when the MD-522(*)/GRC METER FUNCTION any reception mode, the audio output level of the RT-662/GRC must be maintained within the receive limits indicated on the MD-522(*)/GRC front panel test meter.

*a. Local Owr Cw, Ssb Voice, and Compatible Am. Voice.*

(1) See that the MD-522(*)/GRC test pointer indicates 20 VCD, and then turn the METER FUNCTION switch to RCV LEVEL.

(2) Turn the RT-662/GRC SERVICE SELECTOR switch to CW for cw operation; SSB NSK for single-sideband voice operation; or AM for compatible amplitude-modulation (am.) operation.

(3) Adjust the MD-522(*)/GRC AUDIO GAIN control for a comfortable listening level.

(4) If ignition-type (pulse) noise is heard in the received signal, set the RT-662/GRC NOISE BLANKER switch to ON. A 1-second automatic gain control (agc) delay occurs before operation when the NOISE BLANKER switch is set to ON. If noise blanking is not required or does not help reception, set the NOISE BLANKER switch to OFF.

NOTE

Some models of the RT-662/GRC do not contain the NOISE BLANKER switch.

(5) If the noise level is undesirable in the absence of received signals, set the RT-662/GRC SQUELCH switch to ON.

NOTE

In the cw and fsk modes of operation, the squelch circuit is automatically disabled. In the compatible am. or ssb mode of operation, with the SQUELCH switch at ON, the audio output is not completely squelched during periods of high noise level. A low level of audio is always present to indicate that the receiver portion of the RT-662/GRC is operating.

(6) When receiving cw signals, adjust the RT-662/GRC BFO control for a comfortable tone.

(7) When receiving ssb, compatible am., or cw signals from radio sets other than the AN/GRC-106, adjust, if necessary, the RT-662/GRC FREQ. VERNIER control for the best reception obtainable.

(8) To transmit ssb or compatible am., press the M-29/U push-to-talk button and speak into the microphone. To transmit cw, connect and operate the KY-116/U instead of the M-29/U.

NOTE

In the absence of a received tty signal, the MD-522(*)/GRC MODE SELECTOR switch may be turned to VOICE to prevent the teletypewriters from running *open.*

*b. Local Owr Tty Operation, Fsk (850 Hz), Nsk (85 Hz), Half Diversity, or Nsk Plus Voice.*

(1) See that the MD-522(*)/GRC test meter pointer indicates 20 VDC, and then turn the METER FUNCTION switch to RCV LEVEL.

(2) Turn the RT-662/GRC SERVICE SELECTOR switch to SSB NSK for nsk diversity or nsk plus voice operation. For 850-Hz or 85-Hz operation, turn the RT-662/GRC SERVICE SELECTOR switch to FSK.

**CAUTION**

**Do not adjust the AUDIO GAIN control ((3) below) for any indication to the right of the test meter RCV area, the equipment may be damaged.**

(3) Adjust the RT-662/GRC AUDIO GAIN control for an MD-552(*)/GRC test meter pointer indication *within* the RCV level area.

(4) Turn the MD-522(*)/GRC MODE SELECTOR switch to 850 Hz for fsk operation, 85 Hz for nsk operation, 85 Hz DIVERSITY for nsk diversity operation, or 85 Hz—VOICE for nsk plus voice operation.

(5) To monitor dc loop No. 1, turn the MD-522(*)/GRC METER FUNCTION switch to DC LOOP NO. 1.

(6) Adjust the MD-522(*/GRC SCOPE INTENSITY control for a clear indication on the MD-522(*)/GRC cathode ray tube (crt) (fig. 3-13).

(7) Adjust the MD-522(*)/GRC BFO control (850-Hz operation only) for a crt indication of two ellipses of equal amplitude.

NOTE

When communicating with radio sets other than the AN/GRC-10*b*, it may also be necessary to adjust the RT-662/GRC FREQ, VERNIER control.

(8) Adjust the MD-522(*)/GRC AUDIO GAIN control for a comfortable listening level.

(9) Set the power panel INVERTERS OWR ON-OFF switch to ON. (Omit this step during ac only operation.)

(10) Set the TT-98/FG MOTOR and LIGHT switches to ON to print page copy of received messages.

(11) If garbled copy is received, turn the MD-522(*)/GRC RECEIVE-REV/NORM switch to REV.

CAUTION

Turn the MD-522(*)/GRC SCOPE INTENSITY control fully counterclockwise unless the received signal on the MD-522(*)/GRC crt is to be monitored.

(12) If punched tape copy of received messages is required, set the TT-76/GGC POWER, MOTOR, and LIGHT switches to ON.

(13) To transmit from the TT-98/FG or TT-76/GGC keyboard, set the MD-522(*)/GRC RCV-SEND switch to SEND, set the TT-98/FG MOTOR switch or the TT-76/GGD POWER, MOTOR, and LIGHT switches to ON, and operate the applicable keyboard.

(14) To transmit prepared punched tape copy, set the TT-76/GGC POWER, MOTOR, and LIGHT switches to ON, insert the tape into the TT-76/GGC transmitter-distributor, set the MD-522(*)/GRC RCV-SEND switch to SEND, and set the TT-76/GGC START-STOP-FEED RETRACT lever to START.

NOTE

During one-way reversible, nsk plus voice operation, it is *not* possible to receive nsk while transmitting voice or to transmit nsk while receiving voice.

(15) For nsk plus voice transmission, turn the MD-522(*)/GRC MODE SELECTOR switch to 85 HZ + VOICE, the RT-662/GRC SERVICE SELECTOR switch to SSB NSK, perform the applicable procedure ((13) or (14) above), and then press the M-29/U push-to-talk button and speak into the microphone.

## 3-10. Local Duplex Operation AN/GRC-122 (Only)

Perform the starting procedure (para 3-6) and the tuning procedure (para 3-8) before attempting any mode of local duplex operation. Perform the operating procedure (*a* or *b* below) applicable to the mode of duplex operation selected. Notes 1 through 8 (para 3-9) are also applicable to local duplex operation.

*a. Local Duplex Cw, Ssb Voice, and Compatible Am. Voice Operation.*

(1) See that the MD-522(*)/GRC test meter pointer indicates 20 VDC, and then turn the METER FUNCTION switch to RCV LEVEL.

(2) Turn the RT-662/GRC AUDIO GAIN control completely counter-clockwise and its SERVICE SELECTOR switch to CW for CW transmission, to SSB NSK for single-sideband transmission, or to AM for compatible am. transmission.

(3) Turn the duplex RT-662/GRC SERVICE SELECTOR switch to the same setting selected in (2) above.

(4) Adjust the duplex RT-662/GRC AUDIO GAIN control for a comfortable listening level.

(5) If ignition-type (pulse) noise is heard in the received signal, set the duplex RT-662/GRC NOISE BLANKER switch to ON. A 1-second agc delay occurs before operation when the NOISE BLANKER switch is set to ON. If noise blanking does not help reception, set the NOISE BLANKER switch to OFF.

NOTE

Some models of the RT-662/GRC do not contain the NOISE BLANKER switch.

(6) If the noise level is not desirable, in the absence of received signals, set the duplex RT-662/GRC SQUELCH switch to ON.

NOTE

In the cw and fsk modes of operation,

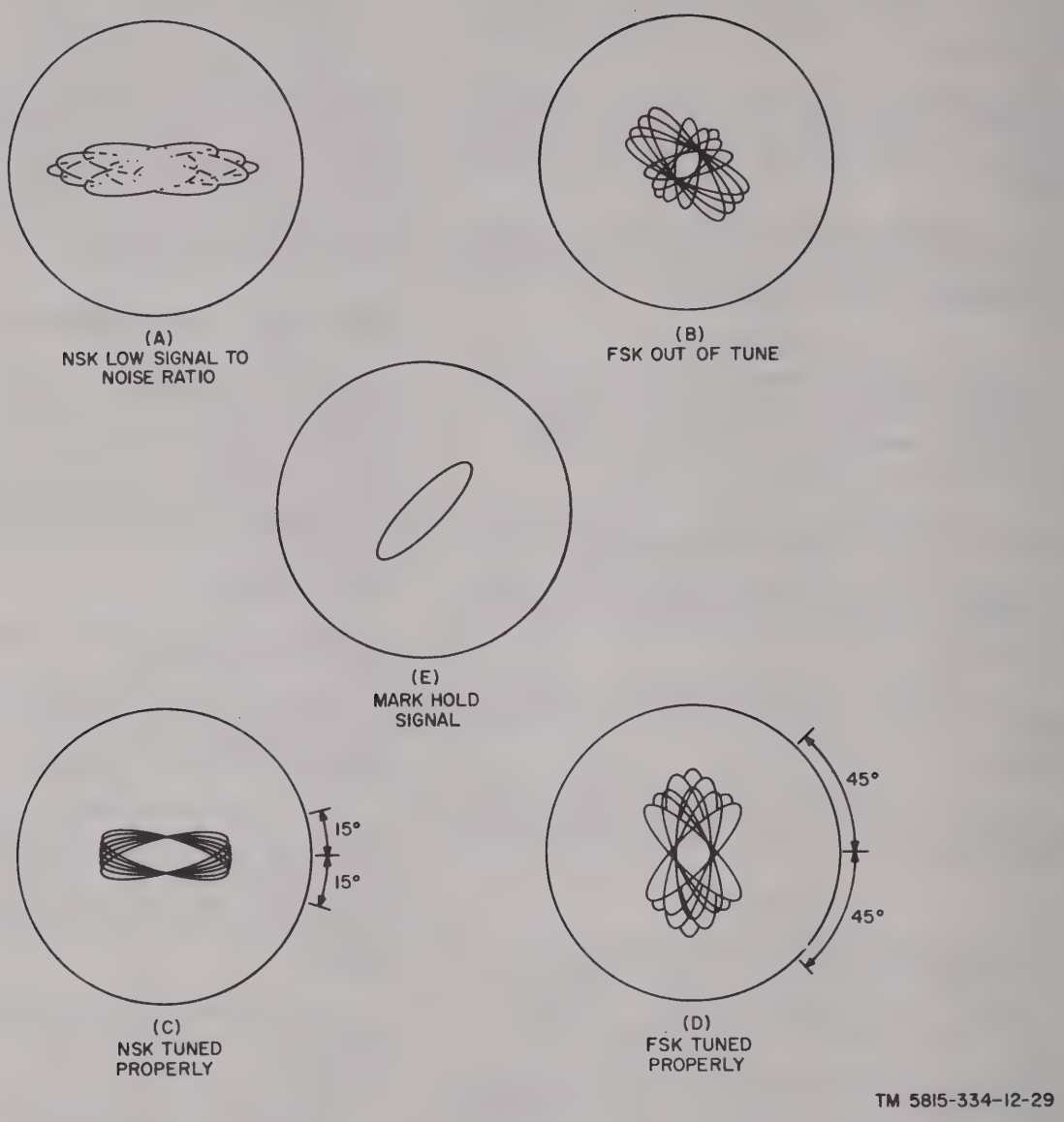



*Figure 3–12. Radio Teletypewriter Modem MD–522(*)/GRC, crt signal patterns.*

the squelch circuit is automatically disabled. In the compatible am. or ssb mode of operation, with the SQUELCH switch at ON, the audio output is not completely squelched during period of high noise level. A low level of audio is always present to indicate that the receiver portion of the duplex RT–662/GRC is operating.

(7) When receiving cw signals, adjust the duplex RT–662/GRC BFO control for a comfortable tone.

(8) When receiving ssb, compatible am., or cw signals from radio sets other than the AN/GRC–106, adjust, if necessary, the duplex RT–662/GRC freq. venier control for the best reception obtainable.

(9) To transmit ssb or compatible am. voice, press the M–29/U push-to-talk button and speak into the microphone. To transmit cw, operate the KY–116/U.

*b. Local Duplex Tty Operation, Fsk (850 Hz), Nsk (85 Hz), Nsk Diversity, or Nsk Plus Voice.*

(1) See that the MD–552(*)/GRC test meter pointer indicates 20 VDC, and then turn the METER FUNCTION switch to RCV LEVEL.

(2) Turn the RT–662/GRC AUDIO GAIN control completely counter-clockwise and the

SERVICE SELECTOR switch to FSK for 850-Hz or 85-Hz transmission. For nsk diversity or nsk plus voice, turn the RT–662/GRC SERVICE SELECTOR switch to SSB NSK.

(3) Turn the duplex RT–662/GRC SERVICE SELECTOR switch to the setting selected in (2) above.

(4) Turn the MD–522(*)/GRC ONE WAY–DUPLEX switch to DUPLEX and the MODE SELECTOR switch to 850 for fsk operation, 85 Hz for nsk operation, 85 Hz DIVERSITY for nsk diversity operation, or 85 Hz + VOICE for nsk plus voice operation.

(5) Adjust the duplex RT–662/GRC AUDIO GAIN control for an MD–522(*)/GRC test meter pointer indication within the RCV area.

(6) To monitor dc loop No. 1 or dc loop No. 2, set the MD–522(*)/GRC METER FUNCTION switch to DC LOOP NO. 1 or DC LOOP NO. 2.

(7) Adjust the MD–522(*)/GRC SCOPE INTENSITY control for a clear indication on the MD–522(*)/GRC cathode ray tube.

(8) Adjust the MD–522(*)/GRC BFO control (850-Hz operation only) for a crt indication of two ellipses of equal amplitude (when receiving baudot code). If a mark–hold signal is being received, only one ellipse will appear on the crt screen.

(9) Adjust the MD–522(*)/GRC AUDIO gain control for a comfortable listening level.

(10) Set the power panel INVERTERS OWR ON–OFF and DX ON–OFF switches at ON (not required during ac only operation).

(11) Set the duplex TT–98/FG MOTOR and LIGHT switches to ON to print page copy of a received message.

(12) If garbled copy is printed, turn the MD–522(*)/GRC RECEIVE–REV–NORM switch to REV.

CAUTION

Turn the MD–522(*)/GRC SCOPE INTENSITY control fully counterclockwise except to monitor the received signal on the MD–522(*)/GRC crt.

(13) Set the MD–522(*)/GRC SEND–RCV switch to SEND.

(14) Operate the TT–98/FG keyboard to transmit a tty message.

(15) Set the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON and perform one of the procedures below for duplex operation of the TT–76/GGC.

(*a*) Operate the TT–76/GGC keyboard to transmit tty messages.

NOTE

The TT–76/GGC keyboard is not available for transmitting when the switchbox TT–76 TAPE PUNCH switch is at DX RECEIVE.

(*b*) To transmit a prepared punched tape message, insert the tape into the TT–76/GGC transmitter-distributor, and set the TT–76/GGC START–STOP–FEED RETRACT lever to START.

NOTE

With the TT–98/FG MOTOR switch at ON, page copy of the transmitted punched tape message is automatically made.

(c) To punch tape copy of a received message, set the switchbox TT–76 TAPE PUNCH switch to DX RECEIVE.

(16) If nsk plus voice operation was selected ((2), (3), and (4) above), set up for tty operation ((1) through (15) above), press the M–29/U push-to-talk button and speak into the microphone to transmit voice; release this button to receive voice.

## 3–11. Remote Operation

Refer to paragraph 2–12 and figure 2–5 for installation details for remote operation of the AN/GRC–142 and AN/GRC–122. One-way reversible (owr) operation is identical for both radio teletypewriter sets. Duplex and Pony (tty order wire) circuit operation is applicable only to the AN/GRC–122; however, no remote duplex voice operation is possible. Before attempting any mode of remote operation, set up the AN/GRC–142 or AN/GRC–122 for the applicable mode of local operation, and then place the radio teletypewriter set at standby (para 3–9).

*a. Remote Telephone Operation.* The stowed TA–312/PT is required for remote telephone operation. In the early models (para 1–13f), remote TA–312/PT telephone operation is not possible during remote cw operation. The remote box and AN/GRA–6 may also be used (*b* below) for remote telephone communication.

(1) Set the controls of both TA–312/PT's as follows: CIRCUIT SELECTOR switch at LB;

EXT–INT switch at INT; buzzer volume control for a comfortable listening level.

(2) Lift either H–33/PT from its mounting and rotate the TA–312/PT generator handcrank to signal the operator at the oher end of the field wire pair.

NOTE

During secure operation, the shelter TA–312/PT buzzer does not operate, but the shelter control panel TEL CALL lamp flickers, indicating that the remote operator is calling.

*b. Remote Box and AN/GRA–6 Telephone Operation.* The remote box and AN/GRA–6 are used as the telephone link when setting up for any mode of remote radio operation.

(1) At the shelter, connect the H–33/PT to Local Control C–434/GRC (p/o AN/GRA–6, fig. 1–1) AUDIO connector and turn the C–434/GRC REMOTE switch to TEL ONLY.

(2) At the remote site, turn Remote Control C–433/GRC (p/o AN/GRA–6, fig. 1–10) SELECTOR switch to TEL.

(3) Rotate the generator handcrank of either unit ((1) or (2) above) to signal the operator at the other end of the field wire pair.

*c. Remote Owr Cw, Ssb Voice, or Compatible Am. Voice Operation.*

(1) Using the AN/GRA–6, instruct the operator at the shelter to perform the following procedure:

(*a*) Set the control panel TEL–REMOTE CW switch to REMOTE CW (for cw operation only).

NOTE

The TEL–REMOTE CW switch does not exist in late models of the AN/GRC–142 and AN/GRC–122. Simultaneous field telephone and remote cw is possible in the late models.

(*b*) Turn the RT–662/GRC SERVICE SELECTOR switch to CW for cw operation, SSB NSK for single-sideband voice operation, or AM for compatible am. voice operation.

(*c*) Turn the AM–3349/GRC–106 PRIM PWR switch to ON. Allow 60 seconds for the AM–3349/GRC–106 time-delay relay to operate.

(2) At the remote site, turn the C–433/GRC SELECTOR switch completely counterclockwise and press the H–33/PT push-to-talk button. If the operator at the shelter indicates that the AN/GRC–106 did not key, release the H–33/PT push-to-talk button and interchange the field wire pair connections to LINE L1 and LINE L2 of the C–433/GRC.

(3) Perform the procedure in (*a*) below for cw operation, or the procedure in (*b*) below for voice operation.

(*a*) Operate the KY–116/U to transmit cw. Connect Headset H–227/U to the remote box AUDIO connector to receive cw.

(*b*) Press the H–33/PT push-to-talk button to transmit voice; release it to receive voice.

*d. Remote Owr Fsk, Nsk, Nsk Diversity, or Nsk Plus Voice Operation.* In this procedure, it is assumed that the required remote equipment has been installed at the remote site; the procedure in *b* above has been performed; the polarity of the dc loop current to the remote box is correct (plus side of field wire pair to + terminal of remote box); the remote tty equipment is plugged into the ac power source at the remote site.

WARNING

An 80-volt dc difference of potential exists between the wires of the field pair when the shelter control panel LOCAL–REMOTE switch is at REMOTE.

(1) Using the AN/GRA–6, instruct the operator at the shelter to perform the following procedure:

(*a*) Set the RT–662/GRC and MD–522(*)/GRC controls for the same mode of tty operation selected (para 3–6) while preparing the shelter for remote owr tty operation.

(*b*) Set the control panel LOCAL–REMOTE switch to REMOTE.

(*c*) Check the dc loop No. 1 current and adjust it (para 2–13) if necessary.

(*d*) Turn the AM–3349/GRC–106 PRIM PWR switch to ON and allow 60 seconds for the AM–3349/GRC–106 time-delay relay to operate.

(*e*) To monitor (at the shelter) the remote tty traffic, set the power panel INVERTERS OWR ON–OFF switch to ON (not required during ac only operation). For page copy of the received or transmitted message, set the TT–98/FG MOTOR and LIGHT switches on. For punched tape copy of the received or transmitted message, set the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON.

(2) At the remote site, perform the applicable procedures ((*a*) through (*f*) below).

(*a*) To receive page copy, set the TT–98/FG MOTOR and LIGHT switches to ON.

(*b*) To transmit from the TT–98/FG keyboard set the remote box SEND–RECEIVE switch to SEND, set the TT–98/FG MOTOR and LIGHT switches to ON; operate the TT–98/FG keyboard.

(*c*) To receive punched tape copy, set the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON.

(*d*) To transmit from the TT–76/GGC keyboard, set the remote box SEND–RECEIVE switch to SEND; the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON; and operate the TT–76/GGC keyboard.

NOTE

When transmitting from the TT–76/GGC keyboard, punched tape copy of the transmitted message is automatically made.

(*e*) To transmit prepared punched tape copy, set the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON, insert the prepared punched tape into the TT–76/GGC transmitter-distributor, set the remote box SEND–RECEIVE switch to SEND, and the TT–76/GGC START–STOP–FEED RETRACT lever to START.

(*f*) If nsk plus voice has been selected, make sure that the H–33/PT has been connected to the remote box AUDIO connector. Press the H–33/PT push-to-talk button to transmit voice; release it for voice reception.

*e. Tty Order Wire Operation (Pony Circuit) (AN/GRC–122 Only).* This circuit provides tty communication, over landlines, between the shelter and a remote site. The tty order wire may be used during one-way reversible operation or when no radio transmission is taking place. The following steps ((1) and (2) below) provide the procedure required for tty order wire operation only. If one-way reversible operation is required simultaneously with tty order wire operation, also perform the local owr procedure (para 3–9*a* or *b*) or the remote owr procedure (*c* or *d* above).

(1) Perform the following at the shelter:

(*a*) Perform the applicable portions of the starting procedure (para 3–6).

(*b*) Set the control panel LOCAL–REMOTE switch to REMOTE.

(*c*) Set the power panel INVERTERS DX switch to ON (omit this step during ac only operation).

(*d*) Set the duplex TT–98/FG MOTOR and LIGHT switches to ON to receive page copy from the remote site.

(*e*) If a punched tape copy of the message from the remote site is required, set the power panel INVERTERS OWR switch to ON (omit this step during ac only operation), the switch box TT–76 TAPE PUNCH switch to DX RECEIVE, and the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON.

(2) Perform the following at the remote site:

(*a*) Set the remote order wire TT–98/FG MOTOR and LIGHT switches to ON.

(*b*) Operate the remote order wire TT–98/FG keyboard to transmit tty messages to the shelter.

*f. Remote Duplex Fsk, Nsk, or Nsk Diversity Operation (AN/GRC–122 only).* Remote duplex tty operation is similar to local duplex tty operation except that duplex nsk plus voice operation is not possible from the remote site. In this procedure, it is assumed that the required equipment is installed at the remote site, the procedure in *b* above has been performed, the polarity of the loop currents is correct (plus side of the field wire pairs to the + terminals of the remote box), and the remote tty equipment is plugged into the 115-volt ac, 60-Hz source of the remote site.

WARNING

An 80-volt dc difference of potential exists between the wires of each field wire pair when the shelter control panel LOCAL–REMOTE switch is at REMOTE.

(1) Using the AN/GRA–6, instruct the operator at the shelter to perform the following:

(*a*) Set the RT–662/GRC, duplex RT–662/GRC and MD–522(*)/GRC controls for the same mode of tty operation that was selected while preparing the shelter (local duplex operation), (para 3–10) for remote duplex tty operation.

(*b*) Set the control panel LOCAL–REMOTE switch to REMOTE.

(*c*) Check the dc loop No. 1 and dc loop No. 2 currents and adjust them (para 2–15) if necessary.

(*d*) Turn the AM–3349/GRC–106 PRIM. PWR switch to ON and allow 60 seconds for the AM–3349/GRC–106 time-delay relay to operate.

(2) To monitor (at the shelter) the remote tty traffic, perform the applicable procedures ((*a*) through (*d*) below).

(*a*) For page copy of the transmitted message, set the power panel INVERTERS OWR switch to ON (not required during ac only opera-

tion) and the TT–98/FG MOTOR and LIGHT switches to ON.

(*b*) For punched tape copy of the transmitted message, set the power panel INVERTERS OWR switch to ON (not required during ac only operation) and the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON.

(*c*) For page copy of the received message, set the power panel INVERTERS DX switch to ON (not required during ac only operation) and the duplex TT–98/FG MOTOR and LIGHT switches to ON.

(*d*) For punched tape copy of the received message, set the power panel INVERTERS OWR switch to ON (not required during ac only operation), and switchbox TT–76/GGC TAPE PUNCH switch to DX RECEIVE, and the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON.

(3) At the remote site, perform the applicable procedures ((*a*) through (*e*) below). Unless otherwise indicated, all controls referred to are those of the remote equipment.

(*a*) To receive page copy, set the remote duplex TT–98/FG MOTOR and LIGHT SWITCHES to ON.

(*b*) To transmit from the TT–98/FG keyboard, set the remote box SEND–RECEIVE switch to SEND, set the TT–98/FG MOTOR and LIGHT switches to ON, and operate the TT–98/FG keyboard.

(*c*) To receive punched tape copy, set the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON.

NOTE

In (*c*) above, the shelter switchbox TT–76 TAPE PUNCH switch must be at DX–RECEIVE.

(*d*) To transmit from the remote TT–76/GGC keyboard, instruct the operator at the shelter to set the switchbox TT–76 TAPE PUNCH switch to OWR–DX–SEND, at the remote site, set the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON; the remote box SEND–RECEIVE switch to SEND; and operate the TT–76/GGC keyboard.

(*e*) To transmit prepared punched tape copy, instruct the operator at the shelter to set the switchbox TT–76 TAPE PUNCH switchbox TT–76 TAPE PUNCH switch to OWR–DX–SEND. Set the remote TT–76/GGC POWER, MOTOR, and LIGHT switches to ON; insert the prepared punched tape into the TT–76/GGC transmitter-distributor; set the remote box SEND–RECEIVE switch to SEND; set the TT–76/GGC START–STOP–FEED RETRACT lever to START.

## 3–12. Recognition and Identification of Jamming

It is likely that under real or simulated tactical conditions, the receiver will be jammed by the enemy. Enemy jamming is easily done by transmitting a strong signal on the same frequency, thereby making it difficult or impossible to hear the desired signal. Unusual noises or strong interference heard on the RT–662/GRC may be enemy jamming, signals from a friendly station, noise from a local source, or the RT–662/GRC may be defective. To determine whether or not the interference is originating in the RT–662/GRC, disconnect the antenna at the RT–662/GRC RECEIVER IN connector and short the antenna connector to the shelter. If the interference continues, the RT–662/GRC is defective. Enemy jamming signals may be typed as continuous wave or modulated. A jamming signal may be intended to block a single frequency. This is called spot jamming. The enemy may use one or several transmitters to jam a block or band of frequencies. This method is called barrage jamming.

*a. Continuous-Wave Jamming.* Cw jamming is transmitted as a steady carrier. This signal beats with another signal and produces a steady tone in the head set. Cw jamming signals may also be keyed by using a random on and off signal or using actual code characters keyed at the same rate or a little faster than the signal being received.

*b. Modulated Jamming.* Modulated jamming signals may consist of noise, laughter, singing, music, various tones, or most any unusual sound or it may be a combination of these sounds. Various types of modulated jamming signals are explained below.

(1) *Spark.* This is one of the simplest, most effective, and most easily produced jamming signals. This type of signal sounds very rough, raspy, and sometimes like an electric motor with sparking brushes running. This type of signal is very broad; therefore, it will interfere with a large number of communication channels.

(2) *Sweepthrough.* This signal is the result of sweeping or moving a carrier back and forth across your frequency at a slow or rapid rate. The numerous signals of varying amplitude and fre-

quency produce a sound like that of a low-flying airplane passing overhead. This type of jamming is effective over a broad range of frequencies. When it varies rapidly, it is effective against all types of voice signals.

(3) *Stepped tones or bagpipes.* This signal usually consists of several separate tones. The tones are transmitted in the order of first increasing and then decreasing pitch, repeated over and over. The audible effect is like the sound of a Scottish bagpipe.

(4) *Noise.* Noise is random both in amplitude and frequency. It is considered one of the better types of jamming similar to that heard when a receiver is not tuned to a station and the volume or gain control is turned to maximum.

(5) *Gulls.* This signal consists of a quick rise and slow fall of a variable audiofrequency. The sound is similar to the cry of a sea gull.

(6) *Tone.* This signal consists of a single audiofrequency of unvarying tone. It produces a steady howl in the headset. Another use of tone is to vary it slowly. It produces a howling sound of varying pitch.

## 3–13. Antijamming

When it is known that the RT–662/GRC is being jammed, the operator will notify the immediate superior officer at once and continue to operate the equipment. To provide maximum intelligibility of jammed signals, follow the operational procedure given below.

*a.* Operate the RT–662/GRC in the desired mode of operation.

*b.* Detune the RT–662/GRC by rotating the FREQ. VERNIER control either side of zero. This may cause some separation of the desired signal and the jamming signal.

*c.* Vary the RT–662/GRC RF GAIN control. This may reduce the jamming signal enough to permit the desired signal to be heard.

*d.* Vary the RT–662/GRC AUDIO GAIN control. The level of the desired signal may be raised enough to be heard.

*e.* If the above procedures do not provide sufficient signal separation for operation, change to the alternate frequency and alternate call signal.

## 3–14. Stopping Procedure

Radio Teletypewriter Set AN/GRC–142 or AN/GRC–122 may be placed in standby or completely shut down. Normally, the stopping procedure requires approximately 3 minutes. Perform the standby procedure (*a* below) when the equipment is to be turned off for periods of 1 hour or less. Perform the complete shutdown procedure (*b* below) when the equipment is to be off for periods exceeding 1 hour. In an emergency, the AN/GRC–142 or AN/GRC–122 may be stopped immediately (*c* below).

*a. Standby.*

| Step | Unit | Control | Position |
|---|---|---|---|
| 1 | AM–3349/GRC–106 | PRIM PWR switch | OFF. |
| 2 | RT–662/GRC | SERVICE SELECTOR switch | OVEN ON. |
| 3 | MD–522(*)/GRC | MODE SELECTOR switch | VOICE. |
| 4 | TT–98/FG | MOTOR switch | OFF. |
| 5 | TT–76A/GGC | POWER and MOTOR switches | OFF. |
| 6 | DUPLEX TT–98/FG (AN/GRC–122 only) | MOTOR switch | OFF. |
| 7 | Power panel | INVERTERS OWR ON–OFF switch (not required during ac only operation). | OFF. |
| | | INVERTERS DX ON–OFF switch (not required during ac only operation). | OFF. |
| 8 | Duplex RT–662/GRC (AN/GRC–122 only) | SERVICE SELECTOR switch | STANDBY. |

*b. Complete shutdown.*

| Step | Unit | Control | Position |
|---|---|---|---|
| 1 | AM–3349/GRC–106 | PRIM PWR switch | OFF. |
| 2 | RT–662/GRC | SERVICE SELECTOR switch | OFF. |
| 3 | Duplex RT–662/GRC (AN/GRC–122 only) | SERVICE SELECTOR switch | OFF. |
| 4 | MD–552(*)/GRC | ON–OFF switch | OFF. |

| Step | Unit | Control | Position |
|---|---|---|---|
| 5 | TT-98/FG | MOTOR and LIGHT switches | OFF. |
| 6 | TT-76/GGC | MOTOR, POWER, and LIGHT switches | OFF. |
| 7 | Duplex TT-98/FG (AN/GRC-122 only) | MOTOR and LIGHT switches | OFF. |
| 8 | Gasoline heater | ON-OFF switch | OFF. |
| 9 | Air conditioner (AN/GRC-142, serial numbers 1 through 697 only). | ON-OFF switch (SW: 2) | OFF. |
| 10 | Power panel | INVERTERS OWR switch | OFF. |
| | | INVERTERS DX switch | OFF. |
| | | 28V RECEP switch | OFF. |
| | | LOCK-OUT switch | OFF. |
| | | BLOWER switch | OFF. |
| | | MAIN PUSH ON-PULL OFF circuit breaker | PULL OFF. |
| 11 | Ac entrance box | Circuit breakers (2) | OFF. |

*c. Emergency Stopping.* To turn off the AN/GRC-142 or AN/GRC-122 in an emergency, pull out the MAIN PUSH ON-PULL OFF circuit breaker. If operating in the ac only mode, set both ac entrance box circuit breakers to OFF.

## Section IV. RADIO TELETYPEWRITER SETS AN/GRC-142A, AN/GRC-142B, AN/GRC-122A, and AN/GRC-122B, OPERATION UNDER USUAL CONDITIONS

**NOTE**

Refer to paragraph 3-3 for the technical manuals that cover shelter components and equipment not covered in this manual.

### 3-15. Operators Controls, Indicators, and Connectors

*a. Panel, Power Distribution SB-3358/GRC-142, Front Panel Controls and Indicators* (fig. 3-13).

| *Control or indicator* | *Function* |
|---|---|
| DC MAIN circuit breaker | In PUSH ON position, dc power is available to all dc powered shelter components. |
| POWER selector switch | In AC position, external ac (115 volts, 60 Hz) is transferred through switching circuits to supply PP-4763(*)/GRC with operating power, and through switching and rectifier networks to furnish dc power for shelter lights and personnel fan. In DC position, external dc or 28 volts dc from vehicle battery are transferred through switches to inverters and to dc operated shelter components. |
| DC indicator lamp | Lights when DC MAIN circuit breaker is at PUSH ON to indicate presence of dc power. |
| AC indicator lamp | Lights when AC MAIN circuit breaker is at ON position to indicate presence of ac power. |
| INVERTERS: | |
| OWR circuit breaker (not used when operating in ac only mode). | Energizes inverter for OWR circuit when placed at ON. Provides protection for OWR circuit by open circuiting when load exceeds 30 amperes. |
| DX circuit breaker (not used when operating in ac only mode). | Energizes duplex inverter (AN/GRC-122A and AN/GRC-122B only) when placed at ON. Provides protection for DX circuit by open circuiting when load exceeds 30 amperes. |
| AC MAIN circuit breaker | In ON position, ac power is available to all ac powered shelter components, except PP-4763(*)/GRC. Provides protection to ac circuits by open circuiting when load exceeds 30 amperes. |
| Meter | Monitors ac or dc input voltage to shelter. |

| *Control or indicator* | *Function* |
|---|---|
| PWR SUP circuit breaker | Energizes PP–4763(*)/GRC when placed at ON. Provides protection for PP–4763(*)/GRC by open circuiting when load exceeds 25 amperes ac. |
| RECP circuit breaker | Energizes shelter 28 VOLT receptacle when placed at ON. When operating from dc source, provides circuit protection by open circuiting when load exceeds 6 amperes. |
| BLO & LIGHTS circuit breaker | Energizes blower and light circuits when placed at ON. Provides protection for blower and light circuits by open circuiting when load exceeds 6 amperes. |
| BLO HI–OFF–LO switch | Energizes blower when placed at HI (high speed) or LO (low speed). |

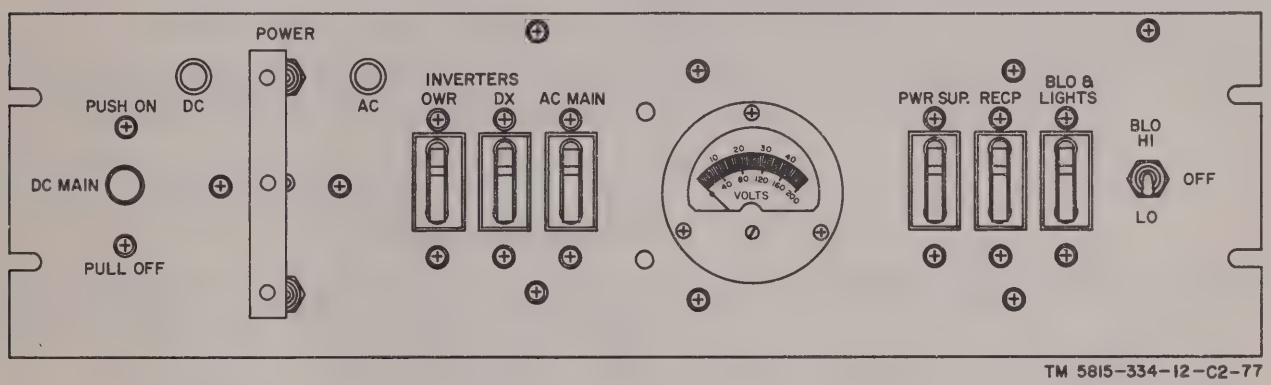



*Figure 3–13. Radio Teletypewriter Set AN/GRC–142A, –142B or AN/GRC–122A, –122B, power distribution panel, controls, indicators, and connectors.*

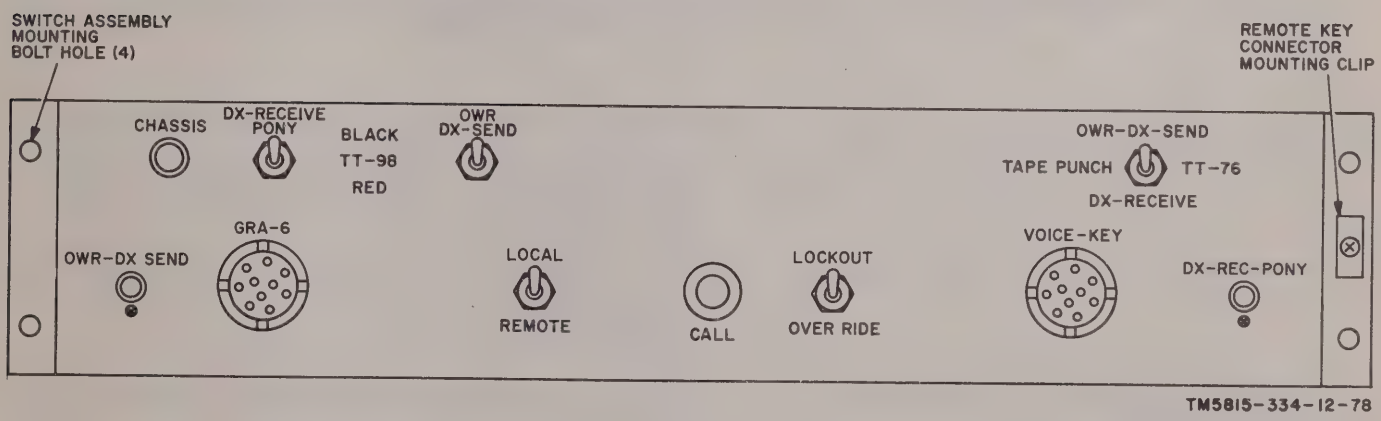



*Figure 3–14. Radio Teletypewriter Set AN/GRC–142A, –142B or AN/GRC–122A, –122B, switch assembly, controls indicators, and connectors.*

### *b. Switch Assembly SA–1650/GRC, Controls, Indicators, and Connectors* (fig. 3–14).

| *Control, indicator, or connector* | *Function* |
|---|---|
| OWR–DX–SEND jack | Dummy box or security equipment is connected into OWR–DX–SEND tty loop at this jack. |
| TT–98 DX–RECEIVE PONY BLACK–RED switch | Enables operator to reduce DX–RECEIVE pony loop current through TT–98/FG for use with security equipment (effective only in AN/GRC–122A and AN/GRC–122B configurations). |

| *Control, indicator, or connector* | *Function* |
|---|---|
| | *Sw pos* — *Action*<br>BLACK — Normal position that results in normal loop current (usually 20 ma).<br>RED — Reduces DX–RECEIVE pony loop current for use with security equipment. |
| TT–98 OWR–DX–SEND BLACK–RED switch | Enables operator to reduce OWR DX–SEND TTY loop current through TT–98/FG for use with security equipment.<br>*Sw pos* — *Action*<br>BLACK — Normal position that results in normal loop current (usually 20 ma).<br>RED — Reduces OWR–DX–SEND TTY loop current for use with security equipment. |
| GRA–6 connector | Provides termination for Local Control C–434/GRC. |
| LOCAL–REMOTE switch | Enables or disables remote teletypewriter operation:<br>*LOCAL position:* Remote teletypewriter operation is disabled.<br>*REMOTE position:* Remote teletypewriter operation is enabled. |
| CALL lamp | Operational only when a secure condition exists and lockout circuit is enabled. Under these conditions, lamp will flicker to indicate that remote operator is ringing local operator and desires that TA–312/PT circuit be returned to normal operation. |
| LOCKOUT–OVERRIDE switch (spring-loaded to return to LOCKOUT when released). | Used to disable lockout circuit when teletypewriter is set up to handle classified messages. Disabling lockout circuit restores TA–312/PT to normal operation and allows remote voice communication with local operator.<br>*Sw pos* — *Action*<br>LOCKOUT — Lockout circuit is enabled.<br>OVERRIDE — Lockout circuit is disabled. |
| VOICE–KEY connector | Provides connection for M–29/U, H–33/PT, or KY–116/U to permit local voice, cw, or nsk plus voice operation as desired. |
| OWR–DX–SEND/TAPE PUNCH/TT–76/DX–RECEIVE switch. | Permits operator to switch TT–76A/GGC tape punch function between OWR DX–SEND loop and DX–RECEIVE or pony (tty order wire) loop.<br>*Sw pos* — *Effect*<br>OWR–DX–SEND — Tape punch is connected into OWR–DX–SEND TTY loop.<br>DX–RECEIVE (used for AN/GRC–122A and AN/GRC–122B only. Switch must be in OWR–DX–SEND position for AN/GRC–142A and AN/GRC–142B.) — Tape punch is connected into DX–RECEIVE pony loop. |
| DX–REC–PONY jack (used for AN/GRC–122A and AN/GRC–122B only). | Dummy box or security equipment is connected into DX–REC–PONY loop at this jack: |

*c. Remote Box Controls and Connectors* (fig. 3–4). The remote box is used in all radio teletypewriter set configurations covered in this manual. Refer to paragraph 3–4*d* for controls and functions.

*d. Power Terminal Assembly Connectors* (fig. 3–15).

| *Connector* | *Function* |
|---|---|
| OWR connector | Direct current power (28 volts dc) for owr inverter is available at this connector when power distribution panel is energized and INVERTERS OWR circuit breaker is ON. |

| *Connector* | *Function* |
|---|---|
| TTY 76 receptacle | Alternating current power (115 volts, 60 Hz) for TT-76/GGC is available at this receptacle when power distribution panel POWER selector switch is in either AC or DC position. |
| TTY 98 receptacle | Alternating current power (115 volts, 60 Hz) for TT-98/FG is available at this receptacle when power distribution panel POWER selector switch is in either AC or DC position. |
| 115 VAC 25A receptacle | Alternating current power (115 volts, 60 Hz) for PP-4763(*)/GRC is available at this receptacle when power distribution panel is energized and the PWR SUP circuit breaker is ON. |
| TTY spare receptacle (duplex side of panel) | Alternating current power (115 volts, 60 Hz) is available at this receptacle when power distribution panel POWER selector switch is in either AC or DC position. |
| TTY 98 receptacle (duplex side of panel) | Alternating current power (115 volts 60 Hz) for duplex TT-98/FG is available at this receptacle when power distribution panel POWER selector switch is in either AC or DC position. |
| DX connector | Direct current power (28 vdc) is available for duplex inverter at this connector when the power distribution panel is energized and INVERTERS DX circuit breaker is ON. |

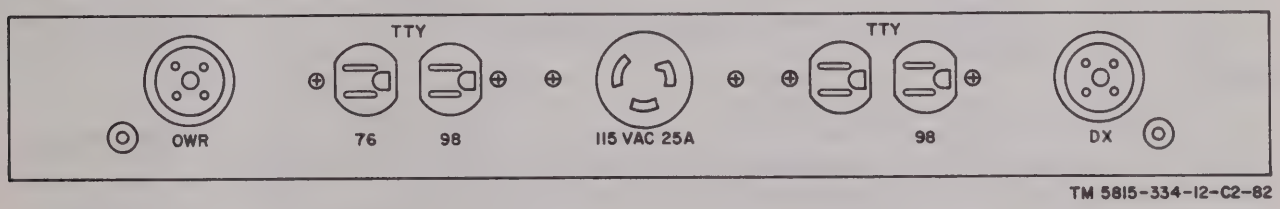



*Figure 3-15. Radio Teletypewriter Set AN/GRC-142A, -142B, or AN/GRC-122A, -122B, power terminal assembly, front panel connectors.*

*e. Standing Wave Ratio-Power Meter ME-165/G Controls, Indicators, and Connectors* (fig. 3-9). The ME-165/G is used in all radio teletypewriter set configurations covered in this manual. Refer to paragraph 3-4*f* for controls, indicators, connectors and their functions.

*f. Low-level Signaling Device TT-523(*)/GGC Controls* (fig. 3-5). The TT-523(*)/GGC is used in all radio teletypewriter set configurations covered in this manual. Refer to paragraph 3-4*e* for control and function.

*g. Power/Signal Entrance Box Connectors* (fig. 3-16).

| *Connector* | *Function* |
|---|---|
| AC INPUT J2 connector | Provides connection to shelter ac circuits from external ac power source. |
| DC INPUT J1 connector | Provides connection for dc input power from vehicle or external dc power source. |
| TA-312/PT terminals (2) | Provide connection from field TA-312/PT to shelter-mounted TA-312/PT. |
| OWR-DX-SEND loop terminals (2) | Provide connection from remote site to shelter owr and duplex send loop tty circuits. |
| DX-REC/PONY loop terminals (2) (used for AN/GRC-122A and AN/GRC-122B only). | Provide connection from remote site to shelter duplex tty receive or pony loop (tty order wire) circuits. |
| C-433/GRC terminals (2) | Provide connection from remote C-434/GRC to shelter-mounted Local Control C-433/GRC for remote keying and remote voice operation. |
| REM CW terminals (2) | Provide connection from remote KY-116/U to AN/GRC-106. |
| GRD terminal | Provides connection for grounding shelter to earth. |

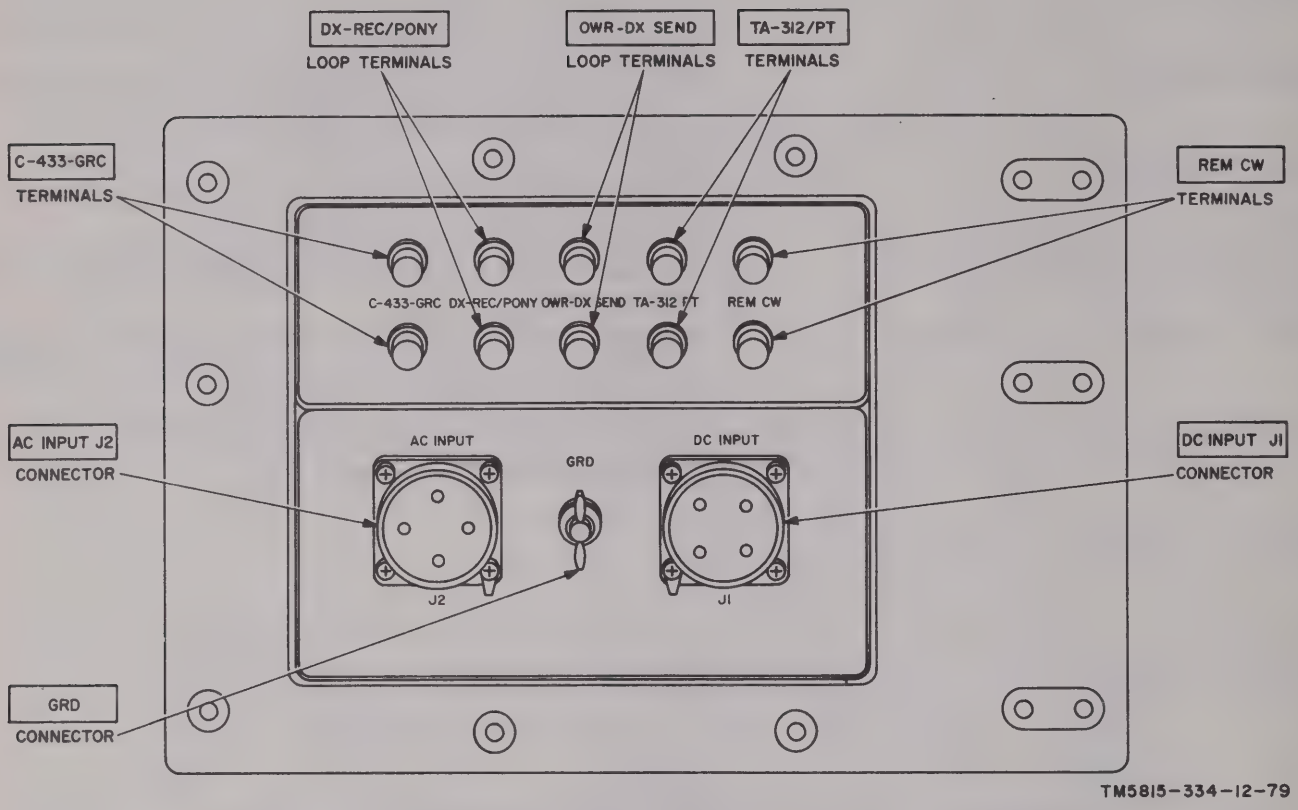



*Figure 3–16. Radio Teletypewriter Set AN/GRC–142A, –142B, or AN/GRC–122A, –122B, power signal entrance box, connectors.*

## 3–16. Types of Operation

The radio teletypewriter sets discussed in this section may be operated either locally or remotely. Whether the AN/GRC–142A or the AN/GRC–142B is operated locally or remotely, only one-way reversible (owr) operation is possible. The AN/GRC–122A or the AN/GRC–122B provides duplex (simultaneous transmission and reception) operation when operated locally or remotely, the only exception being that remote duplex voice operation of the AN/GRC–122A and the AN/GRC–122B is not possible. Operate the radio teletypewriter sets as follows:

*a.* Starting procedure (para 3–17).

*b.* Tuning procedure (para 3–19).

*c.* The AN/GRC–142A, AN/GRC–142B, AN/GRC–122A, and AN/GRC–122B have the following modes of operation. Select the appropriate procedure for the desired mode of operation.

(1) Owr reception, local (para 3–20).

(2) Owr transmission, local (para 3–20).

(3) Owr operation, remote (para 3–32).

(4) Duplex operation, (AN/GRC–122A and AN/GRC–122B only (para 3–21)).

(5) Pony (tty order wire) circuit operation (AN/GRC–122A, –122B only (para 3–22*e*)).

*d.* Operation during radio silence, and output power measurement (para 3–18).

*e.* Stopping procedure (para 3–25).

## 3–17. Starting Procedure

After a complete shutdown, or when starting the equipment for the first time, perform the starting procedures (*a* through *f* below) before attempting any mode of operation. When the equipment is in operation, preset only the applicable controls.

*a. Air Inlets and Outlets.*

(1) Open and latch the air inlet cover on the rear door (figs. 1–15, 1-15.1, and 1-16).

(2) If the heater is to be used, remove the heater exhaust and inlet covers (figs. 1-9 & 1-9.1). Also check the fuel level in the fuel can.

**WARNING**

When checking or filling the fuel can, do not smoke or use an open flame in the

vicinity. When filling the fuel can, always provide a metal-to-metal contact between the fuel container and the fuel can before pouring the fuel.

(3) Check to see that the air inlet and outlet filters (located behind air inlet cover) are clean (figs. 1-15, 1-15.1, and 1-16).

*b. Whip or Doublet Antennas and Ground Rods.*

(1) Check to see that the whip antennas are in operating position, properly connected, and free of obstruction (para 2-8).

(2) If doublet antenna(s) are used, check to see that they are properly constructed (TM 11-5820-467-15) and connected.

(3) Check installation of ground rods (para 2-7).

*c. Truck Exhaust Pipe Hose.* The truck exhaust pipe hose is a flexible steel hose. It is used when the shelter is truck-mounted and being operated at a halt. Insert the nozzle end of the truck exhaust pipe hose into the truck exhaust pipe as far as it will go.

**WARNING**

After continued truck operation, the truck exhaust pipe hose becomes very hot. Allow it to cool before handling. DON'T GET BURNED!

*d. Heater Exhaust Hose.* The heater exhaust hose and the truck exhaust pipe hose are similar. The heater exhaust hose is used when the shelter is being operated at a halt and heat is required in the shelter. Rotate the heater exhaust cover out of the way of the exhaust port (fig. 1-9 and 1-9.1) and insert the exhaust hose nozzle.

*e. Power Sources.*

(1) When using the vehicle power source, set the vehicle throttle for a 28-volt dc output from the vehicle generator as indicated on the power distribution panel meter. Readjust the throttle if necessary as directed in step 1 of the preset chart (*f* below).

(2) When using an external dc power source, the dc power source must have a 100-ampere, 28-volt dc capability with less than 1-percent ripple and better than 2-percent regulation.

(3) For remote teletypewriter operation, a 2-ampere, 115-volt ac, 60-Hz power source is required at the remote site for each teletypewriter.

(4) Operation of the ac circuits within the shelter requires an external ac source capable of supplying 115 volts, 60 amperes, 60 Hz.

*f. Preset Chart.* Before attempting any mode of operation, preset the controls of the AN/GRC-142A, -142B or AN/GRC-122A, -122B as described in the following chart. After presetting the equipment controls, perform the tuning procedures of paragraph 3-8. If operating from an ac source, follow the preset procedure instructions for ac mode operation. This mode of operation requires a power source capable of supply 115 volts ac, 60 Hz at 60 amperes.

**NOTE**

To conserve vehicle battery power, it may be desirable to use only the ac mode even though the vehicle is connected to the vehicle battery. Under this condition, pull the DC MAIN circuit breaker to disconnect the vehicle battery from the shelter power system.

**NOTE**

In the dc mode, and under certain operating conditions, the power distribution panel DC MAIN circuit breaker may *kick-out* when all the shelter components are being energized at the same time. (This condition may be most noticeable during full duplex operation when large starting currents are present.) To alleviate this condition, power should be applied to the various components in the following sequence and as instructed in the preset chart.

(1) Turn all the components off.

(2) Place the power distribution panel POWER switch in the dc mode position.

(3) Place the power distribution panel INVERTERS OWR circuit breaker at ON.

(4) Place the power distribution panel INVERTERS DX circuit breaker at ON (when operating the AN/GRC-122A and AN/GRC-122B).

(5) Turn on the remainder of equipment as instructed in the preset chart and applicable operating procedures.

**NOTE**

For operation in the ac only mode, perform the following sequence of operations and as instructed in the preset chart.

(6) Turn all the components off.

(7) Place the power distribution panel POWER switch at AC.

(8) Turn on the remainder of the equipment as instructed in the present chart (below) and the applicable operating procedures.

| Step No. | Unit | Control or switch position |
|---|---|---|
| 1 | Power distribution panel (fig. 3-13)---------- | Set DC MAIN DC MODE OPERATION circuit breaker to PUSH ON.<br>Set BLO & LIGHTS circuit breaker to ON. (For lights to work with shelter door open, blackout switch (fig. 1-4) must be pulled out).<br>Adjust vehicle throttle for a power distribution panel meter indication of 28 volts. This voltage must be maintained for all modes of operation. Energizing units of radio teletypewriter set may cause voltage to drop. If so, readjust vehicle throttle as necessary to maintain 28-volt indication.<br>Set BLO HI-OFF-LO switch as required.<br>Set RECP circuit breaker to ON.<br>Set DC MAIN AC ONLY OPERATION circuit breaker to PULL OFF.<br>Set POWER switch to AC.<br>Set AC MAIN circuit breaker to ON. Meter should indicate 115 volts ac ±10%.<br>Set BLO & LIGHTS circuit breaker to ON. (For lights to work with shelter door open, blackout switch (fig. 1-4) must be pulled out.)<br>Set BLO HI-OFF-LO switch as required.<br>Set RECP circuit breaker to ON (if ac receptacles are to be used).<br>Set PWR SUP circuit breaker to ON. |
| 2 | Switch assembly (fig. 3-14)---------- | Insure that LOCKOUT-OVERRIDE switch is at LOCKOUT.<br>Set LOCAL-REMOTE switch to LOCAL.<br>Set TT-98 DX-RECEIVE PONY BLACK-RED switch to BLACK (AN/GRC-122A and AN/GRC-122B only).<br>Set TT-98 OWR DX-SEND BLACK-RED switch to BLACK.<br>Set TT-76/TAPE PUNCH/OWR-DX-SEND/DX-RECEIVE switch to OWR-DX-SEND. |
| 3 | Remote box (fig. 3-4)---------- | Set SEND-RECEIVE switch to RECEIVE (if operating remote). |
| 4 | TT-523(*)/GGC (fig. 3-5)---------- | Set TT-523(*)/GGC switch to TD SEND-TR SEND/RCV. |
| 5 | RT-662/GRC and duplex RT-662/GRC (AN/GRC-122A and AN/GRC-122B only) (TM 11-5820-520-12).<br><br>References to RT-662/GRC are also applicable to RT-834/GRC. | SERVICE SELECTOR switch: OVEN ON<br>(Allow a minimum of 10 minutes warm-up time to stabilize equipment).<br>Set the VOX switch to PUSH-TO-TALK.<br>Turn SQUELCH control to OFF.<br>Set NOISE BLANKER switch to OFF.<br>Set BFO control to mid-range.<br>Set MANUAL RF GAIN control fully clockwise.<br>Set AUDIO GAIN control to mid-range.<br>Set FREQUENCY VERNIER to OFF.<br>Set HV RESET switch to OPERATE.<br>Set PRIM PWR switch to OFF. |
| 6 | AM-3349/GRC-106---------- | |

*Caution:* In duplex or owr operation (AN/GRC-122A and AN/GRC-122B only), the transmitting frequency (AN/GRC-106) must differ from the receiving (duplex RT-662/GRC) frequency by 10%, or 1 megahertz, whichever is greater. Tune Duplex Teletypewriter RT-662/GRC to the desired frequency before keying the AN/GRC-106. This must be done even if the RT-662/GRC is *not* turned on.

| Step No. | Unit | Control or switch position |
|---|---|---|
| 7 | Teletypewriter TT-98/FG and Duplex Teletypewriter TT-98/FG (AN/GRC-122A and AN/GRC-122B only) (TM 11-5815-200-12). | Set MOTOR switch to OFF.<br>Set LIGHT switch to OFF.<br>Set LINE/BREAK switch to LINE.<br>Set SEND-LOCK switch to SEND. |
| 8 | TT-76A/GGC (TM 11-5815-238-12) | Set POWER switch to OFF.<br>Set MOTOR switch to OFF.<br>Set LIGHT switch to OFF.<br>Set KEYBOARD switch to SEND.<br>Set SELECTOR switch to 1.<br>Set START-STOP-FEED RETRACT lever to FEED RETRACT. |
| 9 | MD-522(*)/GRC (TM 11-5805-387-15-1 or TM 11-5805-387-15-2). | Set AUDIO GAIN control to Midrange.<br>Set ONE WAY-DUPLEX switch to ONE WAY.<br>Set MODE SELECTOR switch to VOICE.<br>Set RECEIVE switch to NORM.<br>Set METER FUNCTION switch to REGULATED DC.<br>Set SCOPE INTENSITY control to Midrange.<br>Set DC LOOP NO. 1 switch [2] to 20 MA.<br>Set DC LOOP NO. 2 switch [2] to 20 MA.<br>Set MARK/HOLD switch [2] to OFF.<br>Set ON/OFF switch [2] to ON. |
| 10 | Loudspeaker, Dynamic LS-166/U and duplex Loudspeaker LS-166/U (AN/GRC-122A and AN/GRC-122B only). | Set VEHICLE-PACKSET switch to VEHICLE. |
| 11 | C-434/GRC (TM 11-5038) | Set REMOTE switch to TEL ONLY. |
| 12 | TA-312/PT (TM 11-5805-201-12) | Set selector switch to LB.<br>Set INT-EXT switch to INT.<br>Set LOUD control fully clockwise. |
| 13 | C-433/GRC (TM 11-5038) | Set SELECTOR switch to TEL ONLY (if operating remote). |
| 14 | ME-165/G [3] (fig. 3-9) | Set function switch to OPERATE. |
| 15 | Heater | Set ON-OFF switch to OFF. |
| 16 | PP-4763(*)/GRC | Set AC ON-OFF switch to ON (if in ac only mode). |

[1] Some models of RT-662/GRC do not contain the NOISE BLANKER switch.
[2] These front panel controls exist only on the MD-522A/GRC model.
[3] Do not key the AN/GRC-106 (with full power output) for more than 10 minutes at a time with the ME-165/G function switch at POWER.

*g. MD-522(*)/GRC Regulated Dc Check.* Check to see that the MD-522(*)/GRC is receiving 28 volts dc by setting the MD-522(*)/GRC METER FUNCTION SWITCH to REGULATED DC. A reading of 20 volts dc should be observed on the meter. If it is not, corrective maintenance is required.

## 3-18. Operation During Radio Silence, and Output Power Measurement

If the AN/GRC-142A, -142B or AN/GRC-122A, -122B is to be set up for a particular mode of operation during radio silence, the following procedures apply. These procedures may also be used if the daily preventive maintenance checks and services are to be done during a period of radio silence. Also, power output (AN-3349/GRC-106) can also be measured using these procedures. The procedures are divided into two areas: operation with doublet antenna and operation with whip antenna. They are to be performed in conjunction with the starting procedure (para 3-17*a* through *f*) and the tuning procedure (para 3-19).

*a. Operation with Doublet Antenna.*

(1) Perform applicable portions of starting procedure (para 3-17).

(2) Set the ME-165/G function switch to POWER.

(3) Perform the tuning procedure (para 3-19). If maintaining radio silence, disregard instructions to change the setting of ME-165/G function switch from the POWER position. (Vswr measurements cannot be made during radio silence.)

(4) Perform desired mode of operation (para 3-20, 3-21 or 3-22).

(5) Power meter (ME-165/G) indications

should be as follows for the various modes of operation (these are average power readings).

| | | |
|---|---|---|
| (*a*) | Cw | approximately 200 watts. |
| (*b*) | Ssb voice | approximately 200 watts. |
| (*c*) | Compatible am | approximately 100 watts. |
| (*d*) | Fsk or voice +nsk | approximately 200 watts. |
| (*e*) | Nsk | approximately 100 watts. |

*b. Operation in Whip Antenna Mode.*

(1) Perform applicable portions of starting procedure (para 3–17).

(2) Check to see that the AM–3349/GRC–106 PRIM PWR switch is at OFF.

(3) Set the ME–165/G function switch to POWER. Do not change the setting of this switch, doing so will remove the load from the transmitter and may result in component damage.

NOTE

When the CG–2568A/U (5 ft 6 in) is connected ((4) below), the whip antenna is automatically disconnected.

(4) Connect the CG–2568A/U (5 ft 6 in) to the AM–3349/GRC–106 50 OHM LINE connector.

(5) Perform the tuning procedure (para 3–19) for the whip antenna. Disregard any reference to the ME–165/G and the doublet antenna.

(6) Perform the desired mode of operation (para 3–20, 3–21, or 3–22).

(7) Power meter (ME–165) indications should be as follows for the various modes of operation (these are average power readings).

| | | |
|---|---|---|
| (*a*) | Cw | approximately 200 watts. |
| (*b*) | Ssb voice | approximately 200 watts (varies with voice input). |
| (*c*) | Compatible am | approximately 100 watts (varies with voice input). |
| (*d*) | Fsk, or voice +nsk | approximately 200 watts. |
| (*e*) | Nsk | approximately 100 watts. |

(8) Set the AM–3349/GRC PRIM PWR switch to OFF.

(9) Disconnect the CG–2568A/U from the AM–3349/GRC–106 50 OHM LINE connector.

(10) Before attempting to transmit, the AN/GRC–106 will have to be retuned (para 3–19).

### 3–19. Tuning Procedures

The AN/GRC–106 tuning procedure is identical for all radio teletypewriter sets covered in this manual. Perform the starting procedure (para 3–17); then, perform the tuning procedure (para 3–8), except disregard the reference to paragraph 3–6.

### 3–20. Local Owr Operation

Perform equipment starting procedures of paragraph 3–17*a* through *f*, and the tuning procedure (para 3–8). Perform the applicable local owr operation procedure (para 3–9*a* or *b*).

NOTE

The procedures are similar for all models, except that the functions of the power panel (para 3–9b) are performed by Panel, Power Distribution SB–3358/GRC in the AN/GRC–142A and AN/GRC–142B or AN/GRC–122A and AN/GRC–122B.

### 3–21. Local Duplex Operation

Perform equipment starting procedures of paragraph 3–17*a* through *f* and the tuning procedure (para 3–8) except disregard the reference to paragraph 3–6. Refer to paragraph 3–10*a* and *b* for local duplex operation.

NOTE

The procedures are similar for all models, except that the functions of the switch box (para 3–10*b*(15)) are performed by Panel, Power Distribution SB–3358/GRC; and the functions of the switch box (para 3–10*b*(15)) are performed by Switch Assembly SA–1650/GRC in the AN/GRC–142A, –142B and AN/GRC–122A, –122B.

### 3–22. Remote Operation

Refer to paragraph 2–12 and figure 2–6 for installation details for remote operation of the AN/GRC–142A–142B or AN/GRC–122A, –122B.

One-way reversible (owr) operation is identical for both radio teletypewriter sets. Duplex and pony circuit operation is applicable only to the AN/GRC–122A and AN/GRC–122B, however, no remote duplex voice operation is possible. Before attempting any mode of remote operation, set up the AN/GRC–142A, –142B or AN/GRC–122A and AN/GRC–122B, for the applicable mode of local operation; then, place the radio teletypewriter set at standby (para 3–25*a*).

*a. Remote Telephone Operation.* The stowed TA–312/PT is required for remote telephone operation. The remote box and the AN/GRA–6 may also be used (*b* below) for remote telephone communication.

(1) Set the controls of both TA–312/PT's as follows: CIRCUIT SELECTOR switch to LB; EXT–INT switch to INT; buzzer volume control for a comfortable listening level.

(2) Lift either H–33/PT from its mounting and rotate the TA–312/PT generator handcrank to signal the operator at the other end of the field wire pair.

NOTE

During secure operation, the shelter TA–312/PT buzzer does not operate, but the shelter switch assembly CALL lamp flickers, indicating that the remote operator is calling.

*b. Remote Box and AN/GRA–6 Telephone Operation.* The remote box and the AN/GRA–6 are used as the telephone link when setting up for any mode of remote radio operation.

(1) At the shelter, connect the H–33/PT to Local Control C–434/GRC (p/o AN/GRA–6, fig. 1–2) AUDIO connector and turn the C–434/GRC REMOTE switch to TEL ONLY.

(2) At the remote site, turn Remote Control C–433/GRC (p/o AN/GRA–6, fig. 1–19) SELECTOR switch to TEL.

(3) Rotate the generator handcrank of either unit ((1) or (2) above) to signal the operator at the other end of the field wire pair.

*c. Remote Owr Cw, Ssb Voice, or Compatible Am. Voice Operation.*

(1) Using the AN/GRA–6, instruct the operator at the shelter to perform the following procedure:

(*a*) Set the switch assembly LOCAL–REMOTE switch to REMOTE.

(*b*) Turn the RT–662/GRC SERVICE SELECTOR switch to CW for cw operation, SSB NSK for single-sideband voice operation, or AM. for compatible am. voice operation.

(*c*) Turn the AM–3349/GRC–106 PRIM PWR switch to ON. Allow 60 seconds for the AM–3349/GRC–106 time–delay relay to operate.

(2) At the remote site, turn the C–433/GRC SELECTOR switch completely counterclockwise and press the H–33/PT push-to-talk button. If the operator at the shelter indicates that the AN/GRC–106 did not key, release the H–33/PT push-to-talk button and interchange the field wire pair connections to LINE L1 and LINE L2 of the C–433/GRC.

(3) Perform the procedure in (*a*) below for cw operation, or the procedure in (*b*) below for voice operation.

(*a*) Operate the KY–116/U to transmit cw. Connect Headset H–227/U to the remote box AUDIO connector to receive cw.

(*b*) Press the H–33/PT push-to-talk button to transmit voice; release it to receive voice.

*d. Remote Our Fsk, Nsk, Nsk Diversity, or Nsk Plus Voice Operation.* In this procedure, it is assumed that the required remote equipment has been installed at the remote site; the procedure in *b* above has been performed; the polarity of the dc loop current to the remote box is correct (plus side of field wire pair to + terminal of remote box); and the remote tty equipment is plugged into the ac power source at the remote site.

WARNING

An 80-volt dc difference of potential exists between the wires of the field pair when the shelter switch assembly LOCAL–REMOTE switch is at REMOTE.

(1) Using the AN/GRA–6, instruct the operator at the shelter to perform the following procedures:

(*a*) Set the RT–662/GRC and the MD–522(*)/GRC controls for the same mode of tty operation selected (local owr operation, para 3–20) while preparing the shelter for remote owr tty operation.

(*b*) Set the switch assembly LOCAL–REMOTE switch at REMOTE.

(*c*) Check the dc loop No. 1 current and adjust it (para 2–15) if necessary.

(*d*) Turn the AM–3349/GRC–106 PRIM

PWR switch to ON and allow 60 seconds for the AM–3349/GRC–106 time-delay relay to operate.

(*e*) If it is desired to monitor (at the shelter) the remote tty traffic, set the power distribution panel INVERTERS OWR ON–OFF circuit breaker to ON (not required during ac only operation). For page copy of the received or transmitted message, set the TT–98/FG MOTOR and LIGHT switches to ON. For punched tape copy of the received or transmitted message, set the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON.

(2) At the remote site, perform the applicable procedures ((*a*) through (*f*) below).

(*a*) To receive page copy, set the TT–98/FG MOTOR and LIGHT switches to ON.

(*b*) To transmit from the TT–98/FG keyboard, set the remote box SEND–RECEIVE switch to SEND and the TT–98/FG MOTOR and LIGHT switches to ON; operate the TT–98/FG keyboard.

(*c*) To receive punched tape copy, set the TT–76/GGC POWER, MOTOR, AND LIGHT switches to ON.

(*d*) To transmit from the TT–76/GGC keyboard, set the remote box SEND–RECEIVE switch to SEND and the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON, and operate the TT–76/GGC keyboard.

**NOTE**

When transmitting from the TT–76/GGC keyboard, punched tape copy of the transmitted message is automatically made.

(*e*) To transmit prepared punched tape copy, set the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON; insert the prepared punched tape into the TT–76/GGC transmitter-distributor; set the remote box SEND–RECEIVE switch to SEND; and set the TT–76/GGC START–STOP–FEED RETRACT lever to START.

(*f*) If nsk plus voice has been selected, make sure that the H–33/PT has been connected to the remote box AUDIO connector. Press the H–33/PT push-to-talk button to transmit voice; release it for voice reception.

*e. Tty Order Wire (Pony Circuit) Operation (AN/GRC–122A, –122B only).* The pony circuit provides tty communication, over landlines, between the shelter and a remote site. The pony circuit may be used during one-way reversible operation, or when no radio transmission is taking place. The following ((1) and (2) below) provides the procedure required for pony circuit operation only. If one-way reversible operation is required simultaneously with pony circuit operation, also perform the local owr procedure (para 3–20) or the remote owr procedure (*c* or *d* above).

(1) Perform the following procedure at the shelter:

(*a*) Perform the applicable portions of the starting procedure (para 3–17).

(*b*) Set the switch assembly LOCAL–REMOTE switch to REMOTE.

(*c*) Set the power distribution panel INVERTERS DX circuit breaker to ON (omit this step during ac only operation).

(*d*) Set the duplex TT–98/FG MOTOR and LIGHT switches to ON to receive page copy from the remote site.

(*e*) If a punched tape copy of the message from the remote site is required, set the power distribution panel INVERTERS OWR circuit breaker to ON, (omit this step during ac only operation), the switch assembly TT–76 TAPE PUNCH switch to DX–RECEIVE, and the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON.

(2) Perform the following procedure at the remote site:

(*a*) Set the remote pony TT–98/FG MOTOR and LIGHT switches to ON.

(*b*) Operate the remote order wire (pony) TT–98/FG keyboard to transmit tty messages to the shelter.

*f. Remote Duplex Fsk, Nsk, or Nsk Diversity Operation (AN/GRC–122A, –122B Only).* Remote duplex tty operation is similar to local duplex tty operation, except that duplex nsk plus voice operation is not possible from the remote site. In this procedure it is assumed that the required equipment is installed at the remote site, the procedure in *b* above has been performed, the polarity of the loop currents is correct (plus side of the field wire pairs to the + terminals of the remote box), and the remote tty equipment is plugged into the 115-volt ac 60-Hz source of the remote site.

**WARNING**

An 80-volt dc difference of potential ex-

ists between the wires of each field wire pair when the shelter switch assembly LOCAL–REMOTE switch is at REMOTE.

(1) Using the AN/GRA–6, instruct the operator at the shelter to perform the following procedures:

(*a*) Set the RT–662/GRC, duplex RT–662/GRC, and MD–522(*)/GRC controls for the same mode of tty operation that was selected while preparing the shelter (local duplex operation, para 3–21) for remote duplex tty operation.

(*b*) Set the switch assembly LOCAL–REMOTE switch to REMOTE.

(*c*) Check the dc loop No. 1 and dc loop No. 2 currents and adjust them (para 2–15) if necessary.

(*d*) Turn the AM–3349/GRC–106 PRIM. PWR switch to ON and allow 60 seconds for the AM–3349/GRC–106 time-delay relay to operate.

(2) If it is desired to monitor (at the shelter) the remote tty traffic, perform the applicable procedures ((*a*) through (*d*) below.)

(*a*) For page copy of the transmitted message, set the power distribution panel INVERTERS OWR circuit breaker to ON (omit this step during ac only operation) and the TT–98/FG MOTOR and LIGHT switches to ON.

(*b*) For punched tape copy of the transmitted message, set the power distribution panel INVERTERS OWR circuit breaker to ON, (omit this step during ac only operation) and the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON.

(*c*) For page copy of the received message, set the power distribution panel INVERTERS DX circuit breaker to ON (omit this step during ac only operation) and the duplex TT–98/FG MOTOR and LIGHT switches to ON.

(*d*) For punched tape copy of the received message, set the power distribution panel INVERTERS OWR circuit breaker to ON (omit this step during ac only operation), the switch assembly TT–76/GGC TAPE PUNCH switch to DX–RECEIVE, and the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON.

(3) At the remote site, perform the applicable procedures ((*a*) through (*e*) below). Unless otherwise indicated, all controls referred to are those of the remote equipment.

(*a*) To receive page copy, set the remote duplex TT–98/FG MOTOR and LIGHT SWITCHES to ON.

(*b*) To transmit from the TT–98/FG keyboard, set the remote box SEND–RECEIVE switch to SEND and the TT–98/FG MOTOR and LIGHT switches to ON, and operate the TT–98/FG keyboard.

(*c*) To receive punched tape copy, set the TT–76/GGC POWER, MOTOR, and LIGHT switches to ON.

NOTE

In (*c*) above, the shelter switch assembly TT–76 TAPE PUNCH switch must be at DX–RECEIVE.

(*d*) To transmit from the TT–76/GGC keyboard, instruct the operator at the shelter to set the switch assembly TT–76 TAPE PUNCH switch to OWR–DX–SEND, the TT–76/GGC POWER MOTOR, and LIGHT switches to ON; and the remote box SEND–RECEIVE switch to SEND; and operate the TT–76/GGC keyboard.

(*e*) To transmit prepared punched tape copy, instruct the operator at the shelter to set the switch assembly TT–76 TAPE PUNCH switch to OWR–DX–SEND. Set the remote TT–76/GGC POWER, MOTOR, and LIGHT switches to ON insert the prepared punch tape into the TT–76/GGC transmitter-distributor; set the remote box SEND–RECEIVE switch to SEND; and set the TT–76/GGC START–STOP–FEED RETRACT lever to START.

### 3–23. Recognition and Identification of Jamming

Recognition and identification of jamming techniques are identical for all radio teletypewriter sets covered in this manual. Refer to paragraph 3–12 for recognition and identification of jamming information.

### 3–24. Antijamming

Antijamming procedures are identical for all radio teletypewriter sets covered in this manual. Refer to paragraph 3–13 for antijamming procedure.

### 3–25. Stopping Procedure

The radio teletypewriter sets covered in this section may be placed in standby or completely shut down. Normally, the stopping procedure requires approximately 3 minutes. Perform the standby procedure (*a* below) when the equipment is to be turned off periods of 1 hour, or less. Perform the complete shutdown procedure (*b* below) when the equipment is to be off the periods exceeding 1 hour. In an emergency, the radio-teletypewriter sets may be stopped immediately (*c* below).

*a. Standby.*

| Step | Unit | Control | Position |
|---|---|---|---|
| 1 | AM-3349/GRC-106 | PRIM PWR switch | OFF |
| 2 | RT-662/GRC | SERVICE SELECTOR switch | STANDBY |
| 3 | MD-522(*)/GRC | MODE SELECTOR switch | VOICE |
| 4 | TT-98/FG | MOTOR switch | OFF |
| 5 | TT-76/GGC | POWER and MOTOR switches | OFF |
| 6 | Duplex TT-98/FG (AN/GRC-122A and AN/GRC-122B only). | MOTOR switch | OFF |
| 7 | Duplex RT-662/GRC (AN/GRC-122A and AN/GRC-122B only). | SERVICE SELECTOR switch | STANDBY |
| 8 | Power distribution panel: | INVERTER OWR ON-OFF switch | OFF |
| | DC mode operation | INVERTERS DXON-OFF switch | OFF |
| | AC only operation | AC MAIN circuit breaker | OFF |

*b. Complete Shutdown.*

| Step | Unit | Control | Position |
|---|---|---|---|
| 1 | AM-3349/GRC-106 | PRIM PWR switch | OFF |
| 2 | RT-662/GRC | SERVICE SELECTOR switch | OFF |
| 3 | Duplex RT-662/GRC (AN/GRC-122A and AN/GRC-122B only). | SERVICE SELECTOR switch | OFF |
| 4 | MD-522(*)/GRC [1] | ON-OFF switch | OFF |
| 5 | TT-98/FG | MOTOR and LIGHT switches | OFF |
| 6 | TT-76/GGC | MOTOR, POWER and LIGHT switches | OFF |
| 7 | Duplex TT-98/FG (AN/GRC-122A and AN/GRC-122B only). | MOTOR and LIGHT switches | OFF |
| 8 | Shelter heater | ON-OFF switch | OFF |
| 9 | Power distribution panel | INVERTER OWR circuit breaker (not required during ac only operation). | OFF |
| | | INVERTER DX circuit breaker (not required during ac only operation). | OFF |
| | | PWR SUP circuit breaker | OFF |
| | | RECP circuit breaker | OFF |
| | | BLO & LIGHTS circuit breaker | OFF |
| | | BLO HI-OFF-LO switch | OFF |
| | | AC MAIN circuit breaker | OFF |
| | | DC MAIN PUSH ON-PULL OFF circuit breaker | OFF |

[1] The ON-OFF switch exists only on the MD-522A/GRC. For the MD-522/GRC, turn the MODE SELECTOR switch to PWR OFF.

*c. Emergency Stopping.* To turn off the radio teletypewriter sets in an emergency, pull out the DC MAIN PUSH ON-PULL OFF circuit breaker. If operating in the ac mode only, place the AC MAIN circuit breaker and the PWR SUP circuit breaker at OFF.

## Section V. AN/GRC–142(*) OR AN/GRC–122(*) OPERATION UNDER UNUSUAL CONDITIONS

### 3–26. Operation at Low Temperatures

During cold weather operation, observe the following:

*a.* Do not operate teletypewriters below 32° F Keep the shelter interior at a minimum of 40° F to insure proper teletypewriter operation. Failure to observe this precaution may result in permanent damage to the teletypewriters.

*b.* The spaceheater will provide enough heat during mobile service in arctic winter conditions if the shelter exhaust fan is turned off and the exhaust fan hood on the forward exterior wall of the shelter is blocked with any suitable, locally available thermal insulation.

**CAUTION**

If the exhaust fan hood on the exterior wall of the shelter has been blocked by material during severe cold arctic weather the exhaust fan must not be turned on during clement weather unless the material has been removed from the exhaust fan hood.

*c.* For stationary operation where adequate ac power is available, a satisfactory shelter interior temperature can be maintained during arctic winter weather if three 1.5-kilowatt (KW) electric heaters are used. Existing wiring in the shelter will accomodate only one 1.5-kw electric heater. Two of these heaters must be connected to the ac primary power source (exterior to the shelter), using a locally fabricated extension cable with a 30-ampere current rating.

**WARNING**

Operators must open the multifuel heater air intake and exhaust covers before operating the heater.

*d.* If the AN/GRC–106 is to be shut down for 10 or less hours, set the RT–662/GRC SERVICE SELECTOR switch to OVEN ON. For the AN/GRC–122(*), also set the duplex RT–662/GRC SERVICE SELECTOR switch to OVEN ON.

*e.* Allow a 10-minute warmup period before operating the MD–522(*)/GRC.

*f.* Extreme cold causes cables and wires to become hard, brittle, and difficult to handle. Be careful when handling the cables and when connecting them to the shelter so that kinks and unnecessary loops will not result in permanent damage. Make sure that the binding posts, connectors, and receptacles on the outside of the shelter are free of frost, snow, and ice by replacing the covers over the connectors and receptacles when they are not in use. Replace the connector and receptacle covers as soon as they are disconnected; do not drag or place an open connector in the snow.

*g.* Fill the fuel can daily to prevent condensation.

*h.* Service the fuel strainer in the heater daily to remove water which will freeze in the fuel system and render it inoperative (refer to TM 5–4520–211–14 (Hupp) or TM 5–4520–236–14 (Hunter).

**WARNING**

When filling or servicing the fuel system, do not smoke or use an open flame in the vicinity. When filling the fuel can, always provide a metal-to-metal contact between the fuel container and fuel can as fuel flows over the metallic surfaces.

**WARNING**

To avoid *radio frequency burns* where terrain conditions do not provide a good "earth" ground for the shelter, STAY IN THE SHELTER or STAND CLEAR OF THE VEHICLE AND SHELTER *when transmitting* on the whip antenna.

**WARNING**

To prevent a fatal electric shock, when operation is conducted on frozen arctic soil and the Generator Set PU–620/M is used to supply the power, do the following:

*a.* Connect the green wire (frame ground) of the ac power cable CX–10951/G to an unpainted "hard" ground (frame of trailer mounted PU–620/M or ground stud in commercial power distribution box) and check continuity of the green wire from the "hard" ground to the frame of the shelter, with the CX–10951/G connected to the shelter power receptacle.

*b.* If terrain conditions permit drive ground rods (one at the shelter and one at the PU-620/M trailer), and connect ground rods to PU-620/M frame and to the shelter frame, using ground braids supplied with the equipment.

*c.* Connect the black (HOT) and white (RETURN) wires of CX-10951/G to the 115-volt, 60-Hz ac power source.

## 3-27. Operation in Desert Climates

In desert climates, the connectors, receptacles, and binding posts are subject to damage from sand, dirt, and dust. Replace the receptacle and connector covers when they are not in use. Do not drag or place an open connector on the ground. The interior of the shelter may be kept cooler by installing the shade tarpaulin and by operating the air conditioner. To conserve power, keep the shelter door closed and do not operate the exhaust blower when operating the air conditioner (AN/GRC-142, serial numbers 1 through 697 only). When the equipment is not in use, be sure to close the shelter door and all air inlets and outlets. This action will keep dust and sand out of the equipment.

## 3-28. Operation in Tropical Climates

In tropical climates, the equipment is subject to damage from moisture and fungi. Wipe all moisture and fungi from the exterior of the equipment with a lint free cloth. Do not operate any of the units outside of their moistureproof cases for any extended period of time. Use the air conditioner (AN/GRC-142 serial numbers 1 through 697 only) to maintain the shelter interior temperature and humidity at the normal level.

# Chapter 4
# OPERATOR MAINTENANCE

## 4-1. Scope of Operator Maintenance

The maintenance duties assigned to the operator of Radio Teletypewriter Sets AN/GRC-142(*) or AN/GRC-122(*) are listed below together with a reference to the paragraphs covering the specific maintenance function. The duties assigned do not require tools or test equipment other than those issued with the set.

*a.* Daily preventive maintenance checks and services (para 4-5).

*b.* Weekly preventive maintenance checks and services (para 4-6).

*c.* Cleaning (para 4-7).

*d.* Troubleshooting (para 4-8).

*e.* Repairs and adjustments (para 4-9).

## 4-2. Tools and Materials Required for Operator Maintenance

*a. Tools.*

(1) Broom.

(2) Flashlight MX-991.

(3) Open end wrench, ½ x 9/16 inch (FSN 5120-226-5790).

*b. Materials.*

(1) Alignment tool, FSN 5120-293-2081.

(2) Toothbrush, FSN 7510-559-9833.

(3) Cheesecloth, FSN 8305-205-3496.

(4) Crocus Cloth, FSN 5350-221-0872.

(5) Trichloroethane, FSN 6810-664-0273.

(6) (Cleaning) Bond Paper, FSN 7530-448-2352.

(7) Sandpaper, No. 0000, FSN 5350-598-5908.

(8) Sash brush, FSN 8020-205-6512.

## 4-3. Operator Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce downtime, and to assure that the equipment is serviceable.

*a. Systematic Care.* The procedures given in paragraph 4-5, 4-6, and 4-7 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

*b. Preventive Maintenance Checks and Services.* The preventive maintenance checks and services charts (paras 4-5 and 4-6) outline functions to be performed at specific intervals. These checks and services are to maintain Army Electronic equipment in a combat-serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist operators in maintaining combat serviceability, the charts indicate what to check, how to check, and the normal conditions; the *Reference* column lists the illustrations, paragraphs or manuals that contain detailed repair or replacement procedures. If the defect cannot be remedied by the operator, higher category maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

## 4-4. Operator Preventive Maintenance Checks and Services Periods

Preventive maintenance checks and services of the AN/GRC-142(*) or AN/GRC-122(*) are required daily and weekly.

*a.* Paragraph 4-5 specifies checks and services that must be accomplished daily or under the special conditions listed below.

(1) When the equipment is initially installed.

(2) When the equipment is reinstalled after removal for any reason.

(3) At least once each week if the equipment is maintained in standby condition.

*b.* Paragraph 4-6 specifies checks and services that must be performed *once* each week.

**WARNING**

Dangerous voltages exist at the AM-3349/GRC-106 50 OHM LINE and WHIP antenna connectors. Be careful when working around the antenna connectors. Radiofrequency voltages as high as 10,000 volts may exist at these points when the AM-3349/GRC-106 is keyed.

## 4-5. Operator Daily Preventive Maintenance Checks and Services Chart.

| Sequence No. | Items to be inspected | Procedure | Reference Radio Teletypewriter Set AN/GRC –142, –122 | Reference Radio Teletypewriter Set AN/GRC –142A, –142B –122A, –122A |
|---|---|---|---|---|
| 1 | Binding posts and connectors | Remove rust, corrosion, fungi, dirt, and moisture from binding posts, connectors, and receptacles. | | |
| 2 | Field wire and power connectors | Inspect field wire and power connections at entrance boxes for good contact. | | |
| 3 | Ground rods | Inspect ground rods and ground strap connections for good contact. | Para 2–7 | Para 2–7. |
| 4 | Cables | Inspect all exposed cables for kinks, strains, moisture, fungi, loose terminals, and frayed, cut, or damaged insulation. | | |
| 5 | Antennas | *a.* Inspect whip antennas for bent or kinked sections | *a.* Para 2–8*a* | *a.* Para 2–8*a*. |
| | | *b.* Inspect doublet antennas (if used) for damage | *b.* TM 11–5820–467–15 | *b.* TM 11–5820–467–15. |
| | **Caution:** If a whip seciton is bent or damaged, do not attempt repairs while it is mounted. | | | |
| 6 | Exterior surfaces | Remove dirt, dust, grease, and moisture from all exposed parts, especially whip antennas. | | |
| 7 | Fuel level | Check fuel level in fuel can. If less than one-half full, refill with appropriate fuel. | | |
| | **Warning;** When checking or filling the fuel can, do not smoke or use an open flame in the vicinity. When filling the fuel can, always provide a metal-to-metal contact between the fuel container and the fuel can. This contact will prevent a spark from being generated as fuel flows over the metallic surfaces. Do not fill the fuel can when the heater is in operation. | | | |
| | | SHELTER INTERIOR | | |
| 8 | TT–76A/GGC | Check recording tape spool and paper roll for adequate supply. | TM 11–5815–238–12 | TM 11–5815–238–12 |
| 9 | Teletypewriter TT–98/FG and Duplex Teletypewriter TT–98/FG (AN/GRC–122(*) only). | Check paper roll for adequate supply | TM 11–5815–200–12 | TM 11–5815–200–12 |
| 10 | Clock | Check against local time and correct if necessary. | | |
| 11 | Shelter door | Inspect door and door locking devices for damage and ease of operation. | | |
| 12 | Exterior surfaces of operating units | Clean panels and meter glasses on all units. While cleaning, check for broken or loose items, or any apparent deterioration. | Para 4–7 | Para 4–7 |
| 13 | Cables and connectors | Tighten all cable connections (fingertight). Check for correct connections against cabling diagram. Also check for cabling cracks and breaks. Replace cables that have cracks or broken connectors. | Fig. 6–2 | Fig. 6–3 |

| | | | | |
|---|---|---|---|---|
| | | OPERATION | | |
| 14 | Knobs, dials, and switches | While making operating checks (items 15 through 23), observe that mechanical action of each knob, dial, and switch is smooth and free of external or internal binding. | | |
| 15 | Initial setup: | | | |
| | *a.* (AN/GRC–142 or AN/GRC–122 only) | *a.* Preset all controls as outlined in preset chart. Disregard references to heater and air conditioner controls. After adjusting 28-volt input to the shelter, note that POWER lamp on power panel is lighted. Also check to be sure that none of power panel fuse holders are lighted. | *a.* Para 3–6*h*. | |
| | *b.* (AN/GRC–142A, –142B or AN/GRC–122A, –122B only). | *b.* Preset all controls as outlined in preset chart. After adjusting 28-volt dc input to shelter, check to be sure that none of the circuit breakers have *kicked out*. | | *b.* Para 3–17*f*. |
| 16 | Loop current<br>*Note.* The operational checks given in sequence numbers 17, 18, 19, and 20 below can be performed during radio silence if desired. Refer to paragraph 3–7 for procedure (AN/GRC–142 or AN/GRC–122 only) or to paragraph 3–18 (AN/GRC–142A, –142B or AN/GRC–122A, –122B only). | Check loop current and adjust if necessary. | Paras 3–6*i* and *j* and 2–15. | Para 2–15. |
| 17 | Radio tuning | Perform radio tuning procedure on an assigned frequency | Para 3–8 | Para 3–19. |
| | | OPERATION | | |
| 18 | Local owr reception | Perform local owr reception procedures for all modes of operation. Make this check at one of the assigned frequencies known to be transmitting at time this step is performed. | Para 3–9 | Para 3–20. |
| 19 | Local owr transmission | Perform local owr transmission procedures for all modes of operation. Also measure power output for these modes. | Paras 3–7 and 3–9 | Paras 3–18 and 3–20. |
| 20 | Remote operation | If set up for remote operation, perform remote procedures for all modes of operation. Also measure power output for these modes. | Paras 3–7 and 3–11 | Paras 3–18 and 3–22. |
| 21 | Remote telephone operation | Perform remote telephone operation | Para 3–11*a* | Para 3–22*a*. |
| 22 | Local duplex operation (AN/GRC–122(*) only) | Perform duplex operating procedure | Para 3–10 | Para 3–21. |
| 23 | TTY order wire (pony circuit) operation AN/GRC–122(*) only. | If set up for tty order wire (pony circuit) operation, perform pony circuit operating procedure. | Para 3–11*e* | Para 3–22*e*. |

## 4-6. Operator Weekly Preventive Maintenance Checks and Services Chart

These checks and services are to be accomplished weekly, unless directed otherwise by the local commander.

| Sequence No. | Item to be inspected | Procedure | Reference |
|---|---|---|---|
| 1 | Shelter | *a.* If mounted on ground, check supports | Para 2-4*f*. |
| | | *b.* If mounted on vehicle, check to see that all hold-down cables are tight. | Para 2-6*b*. |
| 2 | Tarpaulin | Check shade tarpaulin for tears or missing tiedown ropes. | |
| 3 | Gaskets | Inspect exterior waterproof gaskets, doors, and air inlets for leaks and worn or loose edges, Gaskets must be clean, flexible, and in good condition. | |
| 4 | Air filters | *a.* Check door and blower air filters and clean if necessary. | Para 4-9*b*. |
| | | *b.* Check air-conditioner filter (AN/GRC-142 serial numbers 1 through 697 only). | Technical manual prepared by Redmanson Corp. |
| 5 | Clock | Wind clock | |
| 6 | Fuel lines | Check heater fuel lines for leaks, damage, or excessive deterioration. | TM 5-4520-211-14 (Hupp) or TM 5-4520-236-14 (Hunter). |
| 7 | Air conditioner (AN/GRC-142, serial numbers 1 through 697 only). | Check air-conditioner lines for leaks, damage, or excessive deterioration. | Technical manual prepared by Redmanson Corp. |
| 8 | Teletypewriters | *a.* Check TT-76A/GGC and TT-98/FG ribbons | TM 11-5815-238-12 |
| | | *b.* Check slide operation (AN/GRC-142 or AN/GRC-122 only). | TM 11-5815-200-12 |
| 9 | Fire extinguisher | Check fire extinguisher for broken wire seal on trigger mechanism. If extinguisher has been used, request that it be recharged by appropriate personnel. | |
| 10 | Technical manuals | Check for complete set of technical manuals | App. A. |
| 11 | Spare parts | Check spare parts supply. Replace any deficiencies | Para 1-6*c*. |
| 12 | Tools | Check tools, test equipment, cleaning aids, and lubricant supply. Replace any deficiencies. | Para 4-2. |
| 13 | AN/GRA-6 | Check AN/GRA-6 batteries | TM 11-5038. |
| | | OPERATION | |
| 14 | Heater | Check heater operation if it has not been in use. If in use every day, disregard this check. | TM 5-4520-211-14 (Hupp) or TM 5-4520-236-14 (Hunter). |
| 15 | Air conditioner (AN/GRC-142, serial numbers 1 through 697 only). | Check air-conditioner operation if it has not been in use. If in use every day, disregard this check. | Technical manual prepared by Redmanson Corp. |

## 4-7. Cleaning

Inspect the exteriors of all units. The exterior surfaces should be free of dust, dirt, grease, and fungus.

*a.* Remove dust and loose dirt with a clean cloth.

**WARNING**

The fumes of trichloroethane are toxic. Provide thorough ventilation whenever used. *Do not* use near a flame. Trichloroethane is not flammable, but exposure of fumes to an open flame converts them to highly toxic, dangerous gases.

*b.* Remove grease, fungus, and ground-in dirt from the cases; use a cloth dampened (not wet) with trichloroethane.

*c.* Remove dust or dirt from plugs and jacks with a brush.

**CAUTION**

Do not press on the meter faces (glass) when cleaning; the meter may be damaged.

*d.* Clean the front panels, meters, and control knobs; use a soft, clean cloth. If dirt is difficult to remove, dampen the cloth with water; mild soap may be used for more effective cleaning.

## 4-8. Operator Troubleshooting Chart

The procedures in the troubleshooting chart below is keyed to that in the daily and weekly preventive maintenance checks and services charts (paras

4–5 and 4–6). It is assumed that the vehicular generating system is in good working condition. If the procedure given in the *Checks and corrective measures* column does not remedy the trouble, higher category of maintenance is required. Procedures are for all models, unless otherwise indicated.

| Item No. | Trouble symptom | Probable cause | Check and corrective measures |
|---|---|---|---|
| 1 | Power panel (AN/GRC–142 or AN/GRC–122 only): | | |
| | *a.* MAIN circuit breaker kicks out | *a.* Extremely high starting current | *a.* Refer to note, paragraph 3–6*h*. |
| | *b.* Power panel meter does not indicate any voltage, and POWER lamp does not light. | *b.* (1) Loose dc power cable | *b.* (1) Check for tight connection where dc power cable connects to dc entrance box at front of shelter. Check for tight connection at vehicle battery. |
| | | (2) Defective dc power cable | (2) Check dc power cable. |
| | | (3) Defective ac input cable or PP–4763(*)/GRC (ac mode of operation only). | (3) Check for 110-volt ac indication on ac voltmeter. If voltage is not present, check ac power cable. If voltage is present, check seating at 25-ampere outlet (fig. 1–1). |
| | *c.* Power panel meter does not indicate, but POWER lamp is lighted. | *c.* Defective meter | *c.* Higher category of maintenance required. |
| | *d.* POWER lamp does not light | *d.* Defective lamp | *d.* Replace lamp (para 4–9*f*). |
| | *e.* Fuse holder lights | *e.* Defective fuse | *e.* Replace fuse (para 4–9*c*). If fuse continues to blow, higher category maintenance required. If 28 V RECP fuse blows, remove applicance plugged into 28-volt convenience outlet. |
| 2 | Power distribution panel (AN/GRC–142A, –142B, or AN/GRC–122A, –122B only): | | |
| | *a.* DC MAIN circuit breakers *kicks out.* | *a.* Extremely high starting current | *a.* Refer to note, paragraph 3–17*f*. |
| | *b.* Power distribution panel meter does not indicate any voltage dc mode, and dc indicator lamp does not light. | *b.* (1) Loose dc power cable | *b.* (1) Check for tight connection at applicable shelter entrance box. |
| | | (2) Defective dc power cable | (2) Check dc power cable. |
| | *c.* Dc indicator lamp does not light in dc mode of operation. | *c.* Defective lamp | *c.* Replace lamp (para 4–9*g*). |
| | *d.* Power distribution panel meter does not indicate any voltage in ac mode, and AC indicator lamp does not light. | *d.* Defective ac input cable | *d.* Check for 115-volt indication on ac voltmeter. If voltage is not present, check ac power cable and cable connector seating. |
| | *e.* AC indicator lamp does not light in AC mode operation. | *e.* Defective lamp | *e.* Replace lamp (para 4–9*g*). |
| | *f.* Power distribution panel meter does not indicate any voltage in ac or dc mode of operation. | *f.* Defective meter | *f.* Higher category of maintenance required. |
| | *g.* AC MAIN, INVERTER OWR, INVERTER DX, PWR SUP, or BLO & LIGHTS circuit breakers *kick out.* | *g.* Overload condition | *g.* Reset if circuit breaker continues to *kick out* higher category maintenance is required. |
| | *h.* RECP circuit breaker *kicks out* | *h.* Overload condition | *h.* Reset if circuit breaker continues to *kick out*, remove equipment plugged into associated outlet. |

| Item No. | Trouble symptom | Probable cause | Check and corrective measures |
|---|---|---|---|
| 3 | OWR or DX (AN/GRC–122A and AN/GRC–122B only) inverter does not energize. (Inverter will whine if energized.) | Loose cable connection | Check to see that cable connection at inverter is tight. |
| 4 | *a.* Shelter lamp does not light | *a.* Defective lamp | *a.* Replace lamp (para 4–9*a*). |
| | *b.* Both shelter lights inoperative | *b.* Blackout switch in wrong position. | *b.* Check position of blackout switch. |
| 5 | Blower inoperative | Defective blower | Higher category maintenance required. |
| 6 | No loop current | *a.* MD–522A/GRC circuit breaker or MD–522/GRC fuse blown. | *a.* Reset MD–552A/GRC circuit breaker by placing its ON–OFF switch at ON or check MD–522A/GRC fuse. |
| | | *b.* Open circuit | *b.* For local operation, check to see that all cable connections are tight and properly connected. For remote operation, place control panel (AN/GRC–142 or AN/GRC–122, or Switch Assembly SA–1650/GRC, AN/GRC–142, –142B or AN/GRC–122A, –122B) LOCAL REMOTE switch at LOCAL. If loop current is restored, trouble is in remote installation. Check for broken field wires; check to see that all remote connections are tight and correct (fig. 2–5 or 2–6). |
| 7 | *a.* Radio tuning procedure cannot be accomplished. | *a.* (1) Loose or improper connections. | *a.* (1) Check to see that all RF cables associated with AN/GRC–106 are tight and properly connected (fig. 6–2 or 6–3). |
| | | (2) Blown fuse in RT–622/GRC. | (2) Check fuse in RT–662/GRC and replace if necessary (TM 11–5820–520–12). |
| | | (3) Improper antenna installation. | (3) Check whip antenna installation (para 2–8*a*). |
| | | (4) Defect in AM–3349/GRC–106. | (4) Refer to TM 11–5820–520–12. |
| | *b.* Vswr too high (ME–165/G meter indicates in red area; doublet antenna only). | *b.* Improper doublet antenna installation. | *b.* Check doublet antenna installation (para 2–8*b*). |
| | *c.* Low power output | *c.* Defect in AM–3349/GRC–106 | *c.* Higher category of maintenance required. |
| 8 | *a.* No reception in any mode of operation. | *a.* (1) Loose or improper cable connection. | *a.* (1) See that all cables are tight and properly connected (fig. 6–2 or 6–3). |
| | | (2) H–33/PT, H–227/U, or speaker defective. | (2) Replace H–33/PT, H–227/U, or speaker. |
| | | (3) RT–662/GRC defective | (3) Refer to TM 11–5820–520–12. |
| | | (4) MD–522(*)/GRC defective. | (4) Refer to TM 11–5805–387–15–1 or TM 11–5805–387–15–2. |
| | *b.* No reception, one mode of operation only. | *b.* (1) RT–662/GRC defective | *b.* (1) Refer to TM 11–5820–520–12. |
| | | (2) MD–522(*)/GRC defective. | (2) Refer to TM 11–5805–387–15–1 or TM 11–5805–387–15–2. |

| Item No. | Trouble symptom | Probable cause | Check and corrective measures |
|---|---|---|---|
| | c. Teletypewriter motor does not operate (TT-76A/GGC or TT-98/FG). | c. (1) Loose power cable | c. (1) Check to see that teletypewriter power cable is tight and properly connected. |
| | | (2) Defective teletypewriter | (2) Refer to TM 11-5815-200-12 or TM 11-5815-238-12. |
| | d. Teletypewriter (TT-76A/GGC or TT-98/FG) operation abnormal. | d. (1) Loose or improper cable connections. | d. (1) Check to see that all cables associated with the teletypewriters are tight and properly connected (fig. 6-2 or 6-3). |
| | | (2) Defective teletypewriter | (2) Refer to TM 11-5815-200-12 or TM 11-5815-238-12. |
| | | (3) Defective MD-522(*)/GRC. | (3) Refer to TM 11-5805-387-15-1 or TM 11-5805-387-15-2. |
| 9 | Low power output, or no power output (one or two modes of operation only; not all modes). | a. Loose or improper cable connections. | a. Check to see that all cables are tight and properly connected (fig. 6-2 or 6-3). |
| | | b. Defective teletypewriter | b. Refer to TM 11-5815-200-12 or TM 11-5815-238-12. |
| 10 | No reception or no transmission in any mode of operation, except duplex or pony circuit (AN/GRC-122(*) only). | a. Shelter equipment | a. Check local operation. (Refer to paragraphs 3-7 and 3-9 for AN/GRC-122, or to paragraphs 3-18 and 3-20, for AN/GRC-122A and AN/GRC-122B.) If local operation is satisfactory, trouble is in remote equipment. If local operation is not satisfactory, follow applicable procedures outlined in this chart for local operation troubles, except for duplex or pony circuit. |
| | | b. Remote equipment | b. Check to see that all remote lines are properly installed and tight (fig. 2-5 or 2-6). Also check for proper installation of all remote equipment. Check handset (H-33/PT) by replacing it with known good one. Check KY-116/U by replacing it with known good one. Check AN/GRA-6, both local and remote (TM 11-5038). |
| 11 | Remote telephone inoperative | a. Loose, broken, or improperly connected telephone lines. | a. Check telephone lines between shelter and remote location. Make sure they are properly installed (fig. 2-5 or 2-6) and tightly connected. Also check for any break in field wires. |
| | | b. Defective TA-312/PT | b. Refer to TM 11-5805-201-12. If trouble still present, higher category maintenance is required. |
| 12 | Heater inoperative | a. No fuel | a. Check fuel level (para 4-5, sequence No. 7). |
| | | b. Damaged fuel line | b. Check fuel line for leak or other damage. |
| | | c. Defective heater | c. Refer to TM 5-4520-211-14 (Hupp) or TM 5-4520-236-14 (Hunter). |

| Item No. | Trouble symptom | Probable cause | Check and corrective measures |
|---|---|---|---|
| 13 | Air conditioner inoperative (AN/GRC–142, serial Nos. 1 through 697 only). | *a.* Broken or damaged lines | *a.* Check air conditioner lines for damage. |
| | | *b.* Loose or improperly connected ac input cable. | *b.* Check to see that ac cable is properly connected and tight (para 2–9*c*). |
| | | *c.* Defective air conditoner | *c.* Refer to technical manual prepared by Redmanson Corp. |
| 14 | AUDIO TEL CALL lamp (AN/GRC–142 or AN/GRC–122), or CALL lamp (AN/GRC–142A, –142B or AN/GRC–122A, –122B) does not light. (Operational only during secure operation.) | Defective lamp | Replace lamp (para 4–9*d*). |
| 15 | *a.* Local duplex operation unsatisfactory. | *a.* (1) Defect in send circuit | *a.* (1) Check send circuit by performing appropriate checks on AN/GRC–106, MD–522(*)/GRC, TT, 98/FG, and TT–76A/GRC (Items No. 6 through 9 above.) |
| | | (2) Defect in receive circuit | (2) Check to see that all cables going to the duplex RT–662/GRC, TT–98/FG, and MD–522(*)/GRC are tight and properly connected (fig. 6–2 or 6–3). Check for defective duplex RT–622/GRC (TM 11–5820–520–12). Check for defective duplex TT–98/FG (TM 11–5815–200–12). Check for defective MD–522(*)/GRC (TM 11–5805–387–15–1 or TM 11–5805–387–15–2). |
| | *b.* Remote duplex operation unsatisfactory. | *b.* (1) Defective shelter component. | *b.* (1) Check local duplex operation. If local duplex operation is defective, check as outlined in 15*a* above. If local duplex operation is satisfactory, trouble is in remote equipment. |
| | | (2) Open field wire | (2) Check to see that all field wires are properly connected and in satisfactory condition. |
| | | (3) Remote box or remote teletypewriter defective. | (3) Higher category of maintenance required. |

## 4–9. Operator Repairs and Adjustments

For operator repairs and adjustments involving the AN/GRC–106, MD–522(*)/GRC, AN/GRA–6, TT–76A/GGC, TT–98/FG, heater, or air conditioner, refer to the appropriate technical manual (app A). The folding table (p/o AN/GRC–142 or AN/GRC–122 only) can be positioned as shown in figure 5–3 to facilitate repairs. The instructions given below are applicable to all configurations of the radio teletypewriter sets discussed in this manual unless otherwise indicated.

Shelter door filter removal details for the AN/GRC–142 and AN/GRC–122 and AN/GRC–142A or AN/GRC–122A, serial numbers 1–118 are shown in figure 5–4. Shelter door filter re-

moval details for the AN/GRC–142B or AN/GRC–122B are shown in figure 5–5. Shelter S–318A/G door filter removal details for the AN/GRC–142A or AN/GRC–122A (serial numbers 119 and up) or AN/GRC–142B, –122B are shown in figure 5–6.

*a. Replacement of Shelter Light Bulbs.*

(1) Remove the light bulb by twisting it counterclockwise.

(2) Replace the burned-out light bulb with a 28-volt incandescent type.

*b. Removal and Cleaning of Shelter Door Air Filter.*

(1) Remove the four screws at the rear of the shelter door.

(2) Remove the louvered section of the door.

(3) Remove the filter from the louvered section.

(4) Wash the filter in soapy water and air-dry.

(5) Replace the filter by reversing the above procedure.

*c. Replacement of Power Panel Fuses (AN/GRC–142 or AN/GRC–122 Only).*

(1) Turn off power to the circuit containing the blown fuse.

(2) Remove the defective fuse from the panel by turning it counterclockwise.

(3) Remove the burned-out fuse from the fuse holder and replace it with a new one of the same type and value.

(4) Insert the new fuse into the panel and turn it clockwise.

(5) Energize the circuit.

*d. Replacement of Control Panel Lamp (AN/GRC–142 or AN/GRC–122 Only).*

(1) Remove the red jewel from the lampholder by rotating it counterclockwise.

(2) Remove the lamp by pushing it in and turning counterclockwise.

(3) Replace with lamp type GE NE–51.

(4) Replace the red jewel.

*e. Replacement of Switch Assembly Lamp (AN/GRC–142A, –142B or AN/GRC–122A, –122B).* Perform the procedures given in *d* above.

*f. Replacement of Power Panel POWER Lamp. (AN/GRC–142 or AN/GRC–122).*

(1) Remove the red lamp cover from the panel by rotating it counterclockwise.

(2) Remove the lamp from the red lamp cover by pulling it out.

(3) Replace the lamp with type 327 lamp.

(4) Replace the red lamp cover and insert it into panel.

*g. Replacement of Power Distribution Panel Lamps (AN/GRC–142A, –142B or AN/GRC–122A, –122B).*

(1) Remove the red AC or DC lamp cover from the panel by rotating it counterclockwise.

(2) Pull the lamp from the lamp cover by pulling it out.

(3) Insert MS–25237–327 in the lamp cover.

(4) Replace the lamp cover by rotating it clockwise.

*h. Removal and Cleaning of Shelter Door Filter.*

(1) Remove the screws from the filter holding plates (figs. 5–4, 5–5, or 5–6).

(2) Remove the filter by pulling it downward.

(3) Wash the filter in soapy water and air-dry.

(4) Replace the filter by reversing the above procedure.

*i. Replacement of Whip Antenna Sections.*

(1) Check to see that the AN/3349/GRC–106 PRIM PWR switch is at OFF.

(2) Disassemble the whip antenna to the damaged section by reversing the procedure outlined in paragraph 2–8*a*.

(3) Replace the damaged antenna section.

(4) Reassemble the whip antenna as outlined in paragraph 2–8*a*.

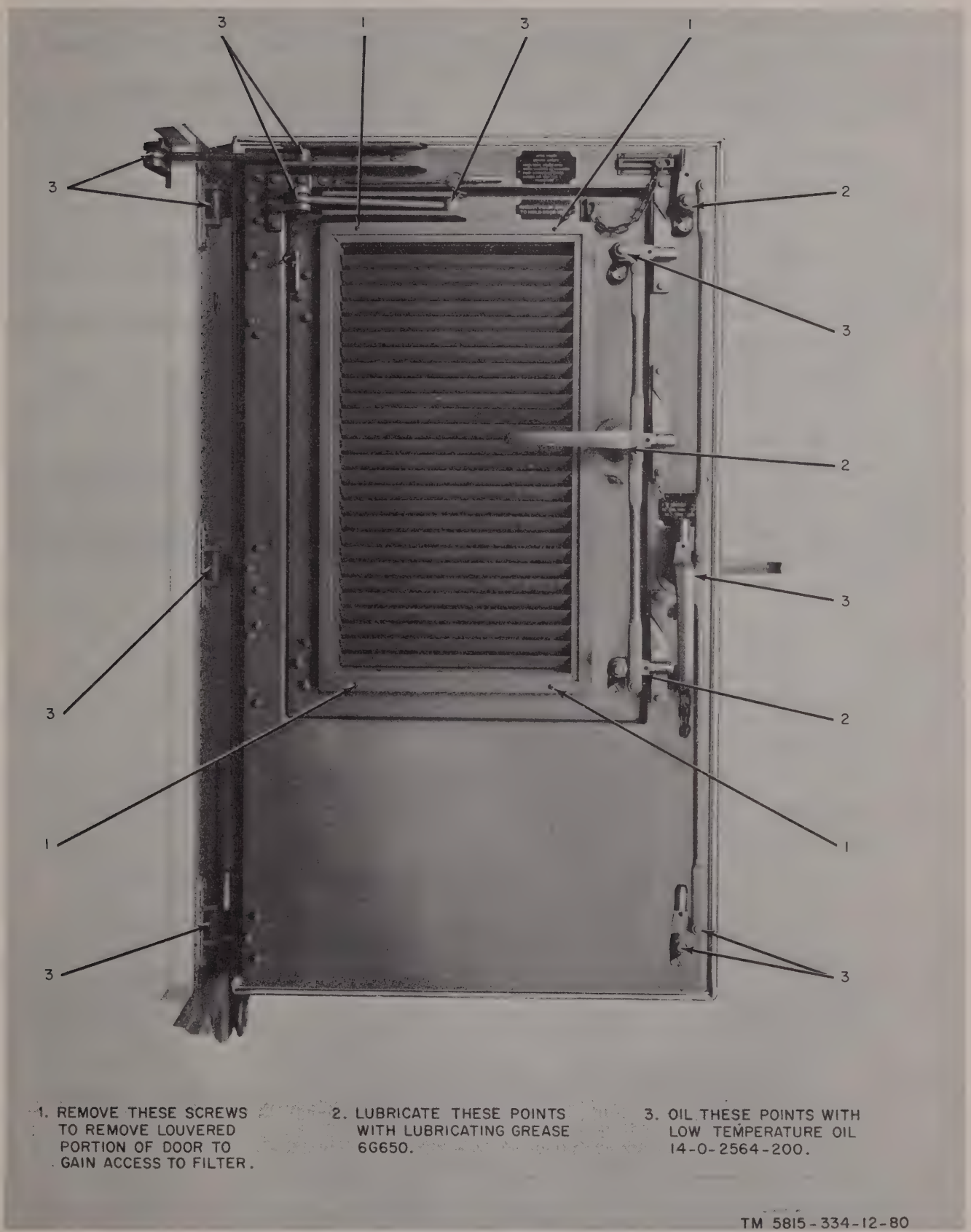



*Figure 4–3. Radio Teletypewriter Set AN/GRC–142B, or AN/GRC–122B, shelter door, filter removal and lubrication details.*

*d. Replacement of Control Panel Lamp (AN/GRC–142 or AN/GRC–122 Only).*

(1) Remove the red jewel from the lampholder by rotating it counterclockwise.

(2) Remove the lamp by pushing it in and turning counterclockwise.

(3) Replace with lamp type GE NE–51.

(4) Replace the red jewel.

*e. Replacement of Switch Assembly Lamp (AN/GRC–142A, –142B or AN/GRC–122A, –122B).* Perform the procedures given in *d* above.

*f. Replacement of Power Panel POWER lamp. (AN/GRC–142 or AN/GRC–122.)*

(1) Remove the red lamp cover from the panel by rotating it counterclockwise.

(2) Remove the lamp from the red lamp cover by pulling it out.

(3) Replace the lamp with type 327 lamp.

(4) Replace the red lamp cover and insert it into panel.

*g. Replacement of Power Distribution Panel Lamps (AN/GRC–142A, –142B or AN/GRC–122A, –122B).*

(1) Remove the red AC or DC lamp cover from the panel by rotating it counterclockwise.

(2) Pull the lamp from the lamp cover by pulling it out.

(3) Insert MS–25237–327 in the lamp cover.

(4) Replace the lamp cover by rotating it clockwise.

*h. Removal and Cleaning of Shelter Door Filter.*

(1) Remove the screws from the filter holding plates (fig. 4–2 or 4–3).

(2) Remove the filter by pulling it downward.

(3) Wash the filter in soapy water and air-dry.

(4) Replace the filter by reversing the above procedure.

*i. Replacement of Whip Antenna Sections.*

(1) Check to see that the AN–3349/GRC–106 PRIM PWR switch is at OFF.

(2) Disassemble the whip antenna to the damaged section by reversing the procedure outlined in paragraph 2–8a.

(3) Replace the damaged antenna section.

(4) Reassemble the whip antenna as outlined in paragraph 2–8*a*.

# Chapter 5

# ORGANIZATIONAL MAINTENANCE

## Section I. GENERAL

### 5-1. Scope of Organizational Maintenance

This chapter contains instructions covering organizational maintenance of Radio Teletypewriter Sets AN/GRC-142(*) or AN/GRC-122(*). It includes instructions for performing preventive and periodic maintenance services, troubleshooting, and repair funcions to be accomplished by the organizational repairman. The quarterly preventive maintenance checks and services chart (para 5-3*c*) covers all models of the radio teletypewriter sets covered in this manual. Section II covers trouble shooting procedures common to all models, except where otherwise noted. Section III covers faulty operation peculiar to the AN/GRC-142 and AN/GRC-122. Section IV covers faculty operation peculiar to the AN/GRC-142A, -142B and AN/GRC-122A, -122B.

### 5-2. Tools, Materials, and Test Equipment Required for Organizational Maintenance

The tools, materials, and test equipment required for organizational maintenance are listed below.

*a. Tools.*

(1) Tool Kit, Electronic Equipment TK-101/G, FSN 5180-064-5178, SC 5180-91-CL-R13.

(2) Adjustable wrench, 10 inch, FSN 5120-449-8083.

*b. Test Equipment.* Multimeter AN/URM-105, FSN 6625-581-2036 (TM 11-6625-203-12).

*c. Materials.*

(2) Trichloroethane.

(2) Lubricating grease (1 lb), 6G650.

(3) Low temperature oil, 14-0-2564-200.

(4) Silicone compound, NSN 6850-00-880-7616.

### 5-3. Quarterly Preventive Maintenance

*a. General.* Preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in serviceable condition, prevent breakdowns, and assure maximum operational capability. Preventive maintenance is the responsibility of all maintenance categories concerned with the equipment and includes the inspection, testing and repair or replacement of parts, subassemblies, or units that inspection and tests indicate would probably fail before the next scheduled periodic service. Preventive maintenance checks and services of Radio Set AN/GRC-142(*) or AN/GRC-122(*) at the organizational category of maintenance are made at quarterly intervals unless, otherwise directed by the commanding officer. The preventive maintenance checks and services should be scheduled concurrently with the periodic service schedule of the carrying vehicle if the shelter is vehicle-mounted.

*b. Forms and Records.* Maintenance forms and records to be used and maintained on this equipment are specified in TM 38-750.

*c. Organizational Quarterly Preventive Maintenance Checks and Services Chart.*

| equence No. | Item to be inspected | Procedure | Reference |
|---|---|---|---|
| 1 | Completeness | Check to see that equipment is complete | Para 1-6*a* and *b*. |
| 2 | Installation | Check to see that shelter and antennas are properly installed. | Paras 2-4, 2-7, and 2-8. |
| 3 | Vehicle installation | Check to see that shelter is properly installed on vehicle. | Para 2-6*b*. |
| 4 | Cleanliness | Check to see that equipment is clean; check for cleanliness of shelter walls, ceiling, and floor. | Para 4-7. |
| 5 | Preservation | Check all surfaces for evidence of fungus. Remove rust and corrosion and spot-paint bare spots. | |
| 6 | Publications | Check to see that all publications are complete, serviceable, and current. | App. A and DA Pam 310-4. |
| 7 | Modifications | Check DA Pam 310-7 to determine if new applicable MWO's have been published. All URGENT MWO's must be applied immediately. All NORMAL MOW's must be scheduled. | TM 38-750 and DA Pam 310-7. |

| Sequence No. | Item to be inspected | Procedure | Reference |
|---|---|---|---|
| 8 | Lubrication | Lubricate door | Para 5-4. |
| 9 | Blackout switch | Check blackout switch for any apparent damage | Fig. 1-3 or 1-4. |
| 10 | Blackout curtain (AN/GRC-142 or AN/GRC-122 only). | Check blackout curtain for tears or damage. | |
| 11 | Chair | Check to see that chair is not damaged or in an unsafe condition. Also check safety belt, shoulder harness, and chair latch. | None. |
| 12 | Fuses (AN-GRC-142 or AN/GRC-122 only). | Check to see that the power panel has correct size fuses installed. | Fig. 3-1. |
| 13 | Mounting | Check to see that all bolts, nuts, and washers are correctly positioned and properly tightened. Check for bent, broken, or cracked brackets. | |
| 14 | Cable connections | Check to see that all cable connections are tight and properly connected. | Fig. 6-3 or 6-3. |
| 15 | Knobs, dials, and switches | While making operating checks (items 16 through 23 below) observe that mechanical action of each knob, dial, and switch is smooth and free of external or internal binding. | None. |
| 16 | AN/GRC-106 and duplex RT662/GRC (AN/GRC-122(*) only). | Check AN/GRC-106 and duplex RT-662/GRC in accordance with monthly preventive maintenance checks and services chart in TM 11-5820-520-12. | None. |
| 17 | MD-522(*)/GRC | Check MD-522(*)/GRC in accordance with quarterly preventive maintenance checks and services chart in TM 11-5805-387-15-1 or TM 11-5805-387-15-2. | None. |
| 18 | AN/GRA-6 | Check AN/GRA-6 in accordance with organizational maintenance instructions given in TM 22-5038. | None. |
| 19 | TT-98/FG and duplex TT-98/FG (AN/GRC-122(*) only). | Check TT-98/FG and duplex TT-98/FG in accordance with organizational maintenance instructions given in TM 11-5815-200-12. | None. |
| 20 | TT-76A/GGC | Check TT-76A/GGC in accordance with organizational maintenance instructions given in TM 11-5815-238-12. | None. |
| 21 | TA-312/PT | Check TA-312/PT in accordance with organizational maintenance instructions given in TM 11-5805-201-12. | None. |
| 22 | Systems check | Perform system checkout by operating AN/GRC-142(*) or AN/GRC-122(*) in its assigned mode or modes of operation. | Para 3-9 or 3-11 (AN/GRC-142 or AN/GRC-122). |
| 23 | Air conditioner (AN/GRC-142, Serial Nos. 1 through 697 only). | Check air conditioner in accordance with organizational maintenance instructions given in technical manual prepared by Redmanson Corp. | Para 3-20 or 3-22 (AN/GRC-142A and AN/GRC-142B, or AN/GRC-122A and AN/GRC-122B). |
| 24 | Space heater | Check space heater in accordance with organizational maintenance instructions given in TM 5-4520-211-14 or TM 5-4520-236-14. | None. |
| 25 | Running spares | Check for complete set of spares. | Para 1-6*c*. |
| 26 | Ventilating fan (exhaust blower) | Check brushes for wear. If worn to ¼ inch or less. replace with new brushes (FSN 5977-686-4476 for IMC Magnetics). | Subparagraph *d*. |
| 27 | PP-4763( )/GRC | Check dc connections for cleanliness and see that nuts are tight. Coat connections with a light film of silicone compound. | |
| | | **NOTE**<br>**For fan motor procured from Rotating Components Division of Instrument Systems Corporation, part No. 70107, use Mfg. part No. 323-01, Federal Mfg. Code 02598.** | |
| 28 | Shelter exterior surfaces. | Check the exterior surfaces of the shelter for dents, tears, holes, and spots void of paint. | TB 750-240. |

*d. Exhaust Blower Motor Brushes Replacement Procedure.*

(1) Disconnect and remove MD-522(*)/GRC and RT-662/GRC (AN/GRC-122 only).

(2) Release the clamp and disconnect the exhaust blower hose from the exhaust blower cover.

(3) Remove the terminal board cover plate.

(4) Remove the 10 nuts and 3 Phillips head screws that secure the exhaust blower cover and remove the cover.

(5) Remove the four screws that secure the back cover of the blower motor and remove the cover.

(6) Remove the plastic caps that hold the motor brushes.

(7) Remove and inspect the brushes. If the brushes are worn to 1/4 inch or less, install new brushes.

(8) Reinstall the brush holders and replace the exhaust blower motor cover.

(9) Replace the exhaust blower cover and complete the reassembly of the equipment. Reverse the procedure given in (1) through (4) above.

NOTE

If either component of Radio Set AN/GRC-106 or AN/GRC-106A requires repair, turn in both the RT-662/GRC or RT-834/GRC, and AM-3349/GRC-106.

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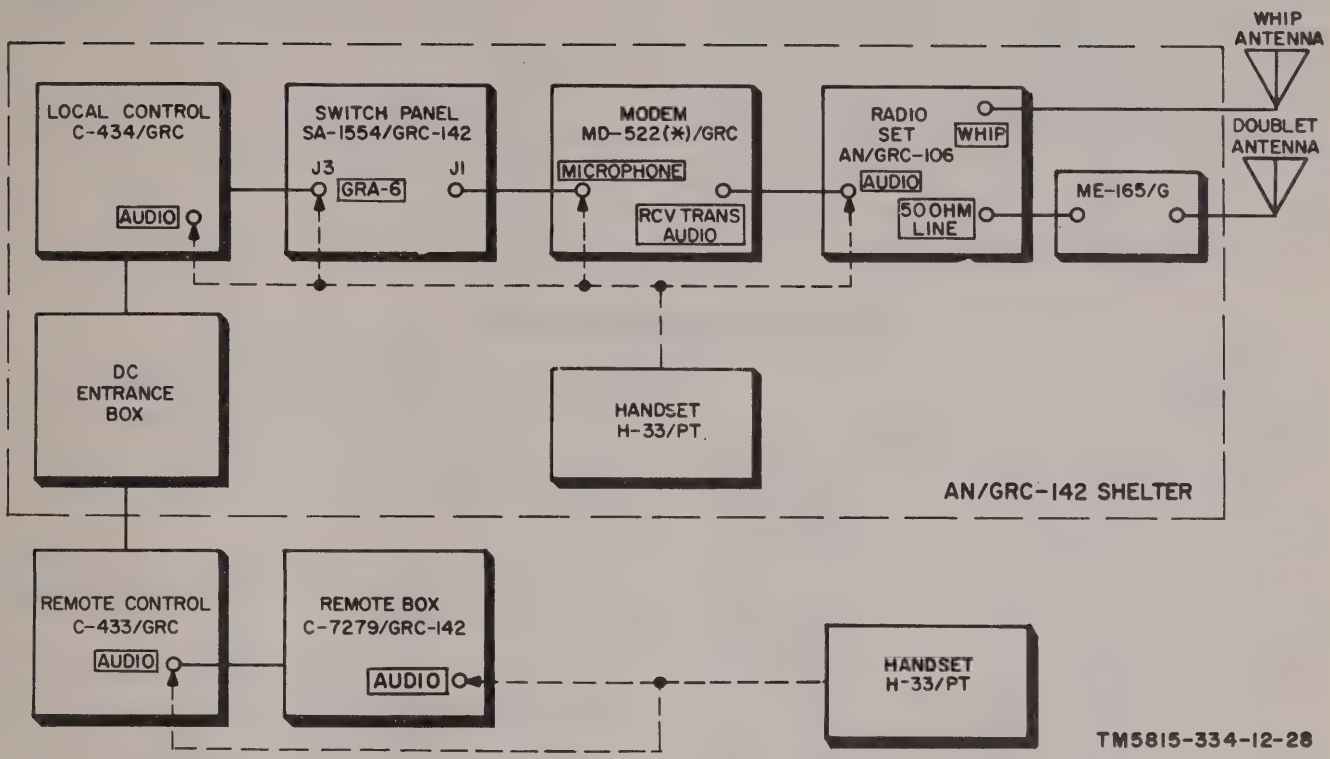


*Figure 5-1. Radio Teletypewriter Set AN/GRC-142, interunit voice frequency signal paths and keying circuits, block diagram.*

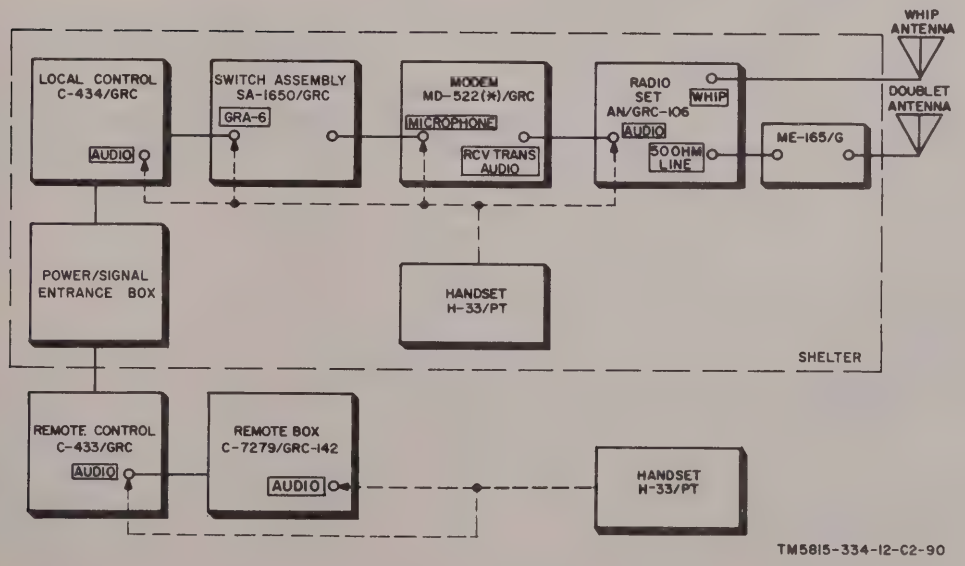


*Figure 5-2. Radio Teletypewriter Set AN/GRC-142A, -142B or AN/GRC-122A, -122B, interunit voice frequency signal paths and keying circuits, block diagram.*

## 5–4. Lubrication

*a.* Lubricate the shelter door hinges and latching mechanism quarterly (every 3 months). The points to be lubricated and the type of lubricant to be used are given in figure 4–2 for the AN/GRC–142 or AN/GRC–122, and in figure 4–3 for the AN/GRC–142A, –142B or AN/GRC–122A, –122B. Do not overlubricate. Wipe off any excess lubricant when lubrication is completed.

*b.* The following items have been lubricated by the manufacturer and require no further lubrication:

(1) Shelter blower motor.
(2) Shelter heater blower motor.
(3) Air conditioner blower motor.
(4) Inverter.
(5) AM–3349/GRC–106 blower motor.

# Section II. TROUBLESHOOTING

## 5–5. General

Troubleshooting of the AN/GRC–142(*) and the AN/GRC–122(*) is based on symptoms that appear during normal operation, or during performance of the maintenance checks and services contained in this manual. The troubleshooting chart (para 5–6) is applicable to all models of the radio teletypewriter sets covered in this manual. Paragraphs 5–7 through 5–12 are troubleshooting procedures and techniques that are applicable to the AN/GRC–142 and the AN/GRC–122 only. Paragraphs 5–13 through 5–18 are troubleshooting procedures and techniques that are applicable to the AN/GRD–142A, –142B, and AN/GRC–122A, –122B only. Use of the troubleshooting chart and the diagrams (*a* through *f* below) will enable the repairman to localize trouble to a particular unit, such as the AN/GRC–106 or the MD–522(*)/GRC. If the corrective measures indicated do not result in correction of the trouble, higher category maintenance is required. Removal and replacement of the units is performed by higher category maintenance personnel.

*a.* Figure 5–1 shows the interunit voice frequency signal paths and keying circuits of the AN/GRC–142, and figure 5–2 shows the interunit voice frequency signal paths and keying circuits of the AN/GRC–142A and AN/GRC–142B configurations.

*b.* Figure 6–1 consists of schematic diagrams of the individual cables of the AN/GRC–142(*) and the AN/GRC–122(*).

*c.* Figure 6–2 is a cording diagram of the AN/GRC–142 and the AN/GRC–122.

*d.* Figure 6–3 is a cording diagram of the AN/GRC–142A, –142B and AN/GRC–122A, –122B.

*e.* Figure 6–4 is a system schematic diagram of the AN/GRC–142 and the AN/GRC–122.

*f.* Figure 6–5 is a system schematic diagram of the AN/GRC–142A, –142B, and AN/GRC–122A, –122B.

## 5–6. Troubleshooting Chart

Unless otherwise indicated the procedures given in the chart below pertain to all models of the radio teletypewriter sets in this manual.

| Item No. | Trouble symptom | Probable cause | Check and corrective measures |
|---|---|---|---|
| 1 | Power panel (AN/GRC–142 or AN/GRC–122 only). | | |
| | *a.* Meter does not indicate any voltage and POWER lamp does not light. | *a.* (1) Defective generating system. | *a.* (1) Disconnect power cable at dc entrance box and check for 28 volts dc between pins A (+) and C (–) of P1. If voltage is absent, trouble is in generating system; higher category of maintenance is required. |
| | | (2) Defect in power distribution circuits. | (2) Higher category of maintenance required. |
| | | (3) Defective ac generating system (ac only mode of operation). | (3) Disconnect ac input cable from ac entrance box. |

| Item No. | Trouble symptom | Probable cause | Check and corrective measures |
|---|---|---|---|
| | | | Check for 110 volts ac between pins A and B of ac input cable connector P1. If voltage is not present, trouble is external to shelter. If voltage is present, higher category of maintenance is required. |
| | *b.* INVERTER OWR fuse continues to blow after being replaced. | *b.* (1) Defective TT–76A/GGC or TT–98/FG. | *b.* (1) Disconnect plugs J1 (TT–76A/GGC) and J2 (TT–98/FG) from distribution box one at a time. If trouble is eliminated, TT–76A/GGC or TT–98/FG is defective. |
| | | (2) Defective inverter | (2) Disconnect plug W23P1 from owr inverter. If trouble is eliminated, inverter is defective. |
| | | (3) Short circuit in dc distribution circuits. | (3) Higher category of maintenance is required. |
| | *c.* INVERTERS DX fuse continues to blow after being replaced. (AN/GRC–122 only). | *c.* Same as *b* above | *c.* Apply procedures (*b* above) to duplex inverter. |
| | *d.* Owr inverter does not energize (inverter will whine when energized). | *d.* Defective inverter, or dc input to inverter absent. | *d.* Check for presence of 28 volts dc between pins A(+) and C (−) of plug W23P1. If voltage is present, inverter is defective. |
| | *e.* Duplex inverter does not energize (AN/GRC–122 only). | *e.* Defective duplex inverter; no dc input to duplex inverter. | *e.* Check for presence of 28 volts dc between pins A (+) and C (−) of plug W22P1. If voltage is present, inverter is defective. |
| 2 | Power distribution panel (AN/GRC–142A, –142B or AN/GRC–122A, –122B only). | | |
| | *a.* Meter does not indicate any voltage in dc mode, and DC lamp does not light. | *a.* (1) Defective generating system. | *a.* (1) Disconnect power cable from DC INPUT connector at entrance box, and check for 28 volts dc between pins A (+) and C (−) of P1. If voltage is absent, trouble is in generating system; higher category of maintenance is required. |
| | | (2) Defect in power distribution circuits. | (2) Higher category of maintenance is required. |
| | *b.* Meter does not indicate any voltage in ac mode, and ac lamp does not light. | *b.* Defective ac generating system (ac only mode of operation). | *b.* Disconnect ac input cable from AC INPUT connector at entrance box. Check for 115 volts ac between pins A and B of ac input cable connector. If voltage is not present, trouble is external to shelter. If voltage is present, higher category of maintenance is required. |

| Item No. | Trouble symptom | Probable cause | Check and corrective measures |
|---|---|---|---|
| | *c.* INVERTERS OWR circuit breaker continues to *kick out* after being reset. | *c.* (1) Defective TT–76A/GGC or TT–98/FG. | *c.* (1) Disconnect plugs mating with J1 (TT–76A/GGC) and J2 (TT–98/FG) of switch assembly one at a time. If trouble is eliminated, TT–76/GGC or TT–98/FG is defective. |
| | | (2) Defective inverter | (2) Disconnect plug from owr inverter. If trouble is eliminated, inverter is defective. |
| | | (3) Short circuit in dc distribution circuits. | (3) Higher category of maintenance required. |
| | *d.* INVERTERS DX circuit breaker contines to *kick out* after being reset (AN/GRC–122A and AN/GRC–122B only). | *d.* Same as *c* above | *d.* Apply procedure *c* above to duplex inverter. |
| | *e.* Owr inverter does not energize (inverter will whine when energized). | *e.* Defective inverter, or dc input to inverter absent. | *e.* Disconnect owr inverter plug from power terminal assembly receptacle J7. Check for 28 volts dc between pins A and C of J7. If voltage is present, inverter is defective. |
| | *f.* Duplex inverter does not energize (AN/GRC–122A and AN/GRC–122B only). | *f.* Defective duplex inverter, no dc input to duplex inverter. | *f.* Disconnect duplex inverter plug from power terminal assembly receptacle J6. Check for 28 volts dc between pins A and C of J6. If voltage is present, inverter is defective. |
| 3 | No loop current, OWR DX–SEND TTY loop (dc loop No. 1). | Open circuit or defective MD–522(*)/GRC. | Perform OWR DX–SEND TTY loop circuit checkout. (Refer to paragraph 5–7 (AN/GRC–142 or AN/GRC–122)), or to paragraph 5–13 (AN/GRC–142A, –142B, or AN/GRC–122A, –122B). |
| 4 | TT–98/FG energizes but impossible to transmit from keyboard, only garbled messages are received. | Defective TT–98/FG | Refer to TM 11–5815–200–12. |
| 5 | TT–76A/GGC energizes but impossible to transmit from keyboard, only garbled messages are received, tape punch not operating properly. | Defective TT–76A/GGC | Refer to TM 11–5815–238–12. |
| 6 | TT–98/FG completely inoperative | Defective TT–98/FG or inverter | In AN/GRC–142 or AN/GRC–122, check for 115 volts ac at J1 on owr inverter. If voltage is not present, check owr inverter (item 1*d* above). If voltage is present, disconnect plug and check for 115 volts ac at receptacle J1 on side of distribution box. If voltage is present at J1, check TT–98/FG fuse (TM 11–5815–200–12). In the AN/GRC–142A, –142B, or AN/GRC–122A, –122B, check for 115 volts ac at J2 on the owr inverter (item 2*e* above). If voltage is present, check for 115 volts ac at TTY–98 receptacle on power terminal assembly. If voltage is present, check TT–98/FG fuse (TM 11–5815–200–12). |

| Item No. | Trouble symptom | Probable cause | Check and corrective measures |
|---|---|---|---|
| 7 | TT–76A/GGC completely inoperative. | Defective TT–76A/GGC, cable, or inverter. | In AN/GRC–142 or AN/GRC–122, check for 115 volts ac at owr inverter ac output connector J1. If voltage is not present, check owr inverter (item 1*d* above). If voltage is present, check for 115 volts ac at receptacle J1 on distribution box. If voltage is present at J1, check TT–76A/GGC fuses (TM 11–5815–238–12). In the AN/GRC–142A, –142B, or AN/GRC–122A, –122B, check for 115 volts ac at owr inverter ac output connector. If voltage is not present, check owr inverter (item 2*e* above). If voltage is present, remove plug and check for 115 volts ac at TTY 76 receptacle on power terminal assembly. If voltage is present at TTY–76 receptacle, check TT–76A/GGC fuses (TM 11–5815–238–12). |
| 8 | Cannot receive or transmit tty at remote site. | Open field wire, defective remote control, or remote tty. | Check local tty operation. If satisfactory, check field wires for broken connections. If local operation is not satisfactory, refer to appropriate item number in this chart. If field wires are satisfactory, replace remote control. If replacing remote control does not eliminate trouble, remote teletypewriter is defective. |
| 9 | AM–3349/GRC–106 or RT–662/GRC inoperative. | Defect in power distribution circuit AM–3349/GRC–106 or RT–662/GRC. | Disconnect plug (W33P1) from RT–662/GRC and plug W34P1 from AM–3349/GRC–106. Measure 28 volts dc between pins A (+) and C (–) of each plug. If voltage is present, trouble is in AM–3349/GRC–106 or RT–662/GRC; refer to TM 11–5820–520–12. |
| 10 | AM–3349/GRC–106 overload relay. kicks out (whip antenna being used) when tuning is attempted. | Open antenna circuit or defect in AM–3349/GRC–106. | Place ME–165/G function switch in POWER position. Using CG–2568A/U, connect ME–165/G INPUT connector to 50-OHM LINE connector on AM–3349/GRC–106. If AM–3349/GRC–106 operates satisfactorily, check whip antenna and cables for open circuit. If AM–3349/GRC–106 does not operate properly using ME–165/G, refer to TM 11–5820–520–12. |
| 11 | AM–3349/GRC–106 does not key (any local mode of operation). | Defective cable W17 or MD–522(*)/GRC. | Disconnect cable W17P2 from MD–522(*)/GRC front panel. Short circuit pin W17P2–F to ground. If AM–3349/GRC–106 keys, MD–522(*)/GRC is defective. If AM–3349/GRC–106 does not key, check cable W17. |
| 12 | AM–3349/GRC–106 does not key in any remote mode of operation. | Defective C–434/GRC, C–433/GRC, remote box, or cabling. | Perform remote key checkout for AN/GRC–142 or AN/GRC–122 (para 5–8) or for AN/GRC–142A and AN/GRC–142B, or AN/GRC–122A and AN/GRC–122B (para 5–14). |

| Item No. | Trouble symptom | Probable cause | Check and corrective measures |
|---|---|---|---|
| 13 | Telephone (TA–312/PT) inoperative | Defective shelter wiring, control panel (AN/GRC–142 or AN/GRC–122), or switch assembly (AN/GRC–142A, –142B or AN/GRC–122A, –122B), field wire, or TA–312/PT. | Perform checkout of telephone circuit (paragraph 5–9 for AN/GRC–142 or AN/GRC–122 or paragraph 5–15 for AN/GRC–142A, –142B or AN/GRC–122A, –122B). |
| 14 | Remote cw operation is not functioning properly. | Defective control panel (AN/GRC–412 or AN/GRC–122), or switch assembly (AN/GRC–142A, –142B, or AN/GRC–122A, –122B), or field cable. | Perform checkout of remote cw circuit (paragraph 5–10 for AN/GRC–142 or AN/GRC–122 or paragraph 5–16 for AN/GRC–142A, –142B, or AN/GRC–122A, –122B). |
| 15 | Air conditioner inoperative. (AN/GRC–142 serial numbers 1 through 697 only). | Defect in ac power distribution circuit or cable W20, or faulty air conditioner. | Disconnect cable W20P1 from air conditioner. Measure 110 volts ac ±10% between pins P1–A and P1–C. If voltage is present, air conditioner is defective. If voltage is not present, check continuity of W20 (fig 6–1). If cable checks satisfactorily, defect is in ac distribution circuit. |
| 16 | Heater inoperative | Defect in dc power distribution circuit, or defective heater. | Disconnect Cable W35P1 from heater. Measure 28 volts dc ±10% between pins W35P1–C and W35P1–A. If voltage is present, heater is defective; higher category maintenance is required. If voltage is absent, defect is in dc distribution circuit. |
| 17 | TT–76A/GGC tape punch operation defective (SELECTOR switch in position 2 or 3); copy is garbled. | Defective TT–523/GGC or TT–76A/GGC. | Higher category of maintenance required. |
| 18 | Faulty transmit or receive operation | Defective AN/GRC–106, MD–522(*)/GRC, cable, or C–434/GRC. | Perform troubleshooting procedure for AN/GRC–142 or AN/GRC–122 (para 5–11), or for AN/GRC–142A, 142B, or AN/GRC–122A, –122B (para 5–17). |
| 19 | No loop current, DX–RECEIVE pony loop (dc loop No. 2) (AN/GRC–122(*) only). | Open circuit or defective MD–522(*)/GRC. | Perform DX–RECEIVE pony loop circuit checkout for AN/GRC–122 (para 5–12) and for AN/GRC–122A and AN/GRC–122B (para 5–18). |
| 20 | Duplex TT–98/FG completely inoperative (AN/GRC–122(*) only). | Defective duplex TT–98/FG or inverter. | Check for 115 volts ac at ac receptacle of duplex inverter. If voltage is not present, inverter is defective. If voltage is present, check for 115 volts ac at distribution box ac receptacle J3 (AN/GRC–142 or AN/GRC–122), or at DUPLEX TTY–98 receptacle of power terminal assembly (AN/GRC–142A, –142B, or AN/GRC–122A, –122B). If voltage is present, check duplex TT–98/FG (TM 11–5815–200–12). |
| 21 | No reception on duplex RT–662/GRC (AN/GRC–122(*) only). | Defective cabling or duplex RT–662/GRC. | Remove W32P1 from POWER connector of duplex RT–662/GRC. Measure 28 volts dc between pins C(−) and A(+) of W32P1. If voltage is absent, cabling is defective. If voltage is present, check duplex antenna and cable connecting duplex RT–662/GRC AUDIO connector to MD–522(*)/GRC AUX RCVR AUDIO connector. |

## Section III. FAULTY OPERATION (AN/GRC–142 or AN/GRC–122)

### 5–7. OWR DX–SEND TTY Loop Circuit Checkout (AN/GRC–142 or AN/GRC–122 only)

Procedures for location of an open circuit within the OWR DX–SEND TTY loop (dc loop No. 1) is given below. A no-loop current condition is indicated by a zero reading on the MD–522(*)/GRC meter. A no-loop current condition can be caused by a defect in MD–522(*)/GRC, control panel, dummy box, switchbox, TT–76A/GGC, TT–98/FG, TT–523/GGC, or cabling.

**WARNING**

Dangerous voltages (100 volts dc, regulated) exist in the loop circuits. Be extremely careful when working near these circuits.

*a.* Turn the MD–522(*)/GRC METER FUNCTION switch to DC LOOP No. 1. Remove plug (W12P1) from OWR DX–SEND jack on the front of the control panel and observe the loop current indication on the MD–522(*)/GRC meter. Perform the applicable procedures given in *b* (no current) or *c* (current present) below.

*b.* If no current is present, remove cable W14 from the MD–522(*)/GRC front panel and measure for 100 volts dc ±20 percent between pins A (+) and C (—) of the MD–522(*)/GRC DC LOOP No. 1 connector (OWR/DX–SEND).

(1) Absence of the 100 volts dc indicates a defective MD–522(*)/GRC, higher category of maintenance is required.

(2) Presence of the 100 volts dc indicates a defective cable or control panel. Turn off the MD–522(*)/GRC and remove cable W14 from the rear of the control panel. Check for short circuit and continuity of cable W14. If the continuity is satisfactory, the control panel is defective and higher category maintenance is required. If there is not continuity, cable W14, is defective.

*c.* If current is present, turn the MD–522(*)/GRC and both inverters off. Remove the four bolts from the switchbox front panel and lower it to reach the rear connectors. Disconnect cables W1, W6, W2, and W5 from the switchbox and check the continuity as given below. Set the TT–76A/GGC SELECTOR switch to position 1; the TT–523/GGC switch to TD SEND, TR SEND/RCV position; and all switch box controls in the up positions before making continuity measurements.

| *Cable* | *Pins* | *Resistance* |
|---|---|---|
| W1P1 | B and C | Approximately 10 ohms. |
| W6P1 | B and C | Approximately 250 ohms. |
| W2P1 | B and C | Approximately 1,500 ohms, depending on setting of TT–98/FG LINE INCREASE control. |
| W5P1 | B and C | Approximately 250 ohms. |

*d.* If the continuity checks above are not satisfactory, check the continuity at the terminal board of the TT–98/FG or on the bottom of the TT–76A/GGC. Check continuity only at the terminals corresponding to the cable having the incorrect continuity reading. Refer to the chart below for this measurement. Unbolt the TT–76A/GGC from the slides by removing the dust cover and removing the bolt from each corner of the machine base. Tip up the TT–76A/GGC to reach the terminal boards for continuity measurement. Remove the TT–98/FG dust cover to reach the terminal board. If continuity at the TT–98/FG is not correct, the TT–98/FG is defective. If continuity at the TT–76A/GGC is not correct, the TT–523/GGC may be defective. If replacing the TT–523/GGC does not remedy the trouble, the TT–76A/GGC is defective. If continuity measurements at the TT–76A/GGC and TT–98/FG are satisfactory, cable W1, W6, W2, or W5 is defective.

| *Cable* | *Terminal board pins* | *Location* | *Resistance* |
|---|---|---|---|
| W1P1 | 1 and 6 | TT–76A/GGC | Approximately 10 ohms. |
| W6P1 | 4 and 5 | TT–76A/GGC | Approximately 250 ohms. |
| W2P1 | 2 and 5 | TT–98/FG | Approximately 1,500 ohms, depending on setting of TT–98/FG LINE INCREASE control. |
| W5P1 | 3 and 4 | TT–98/FG | Approximately 250 ohms. |

*e.* Disconnect cables W7P2 and W10P2 at the switchbox. Check for continuity between the tip of W12P1 and W10P2–B; and between the ring of W12P1 and W7P2–B. If there is continuity, the switchbox is defective. If there is no continuity, check the continuity of cables W7, W10, and W12 against the applicable cable diagram. A defective cable will require repair at a higher category of maintenance. If the cables check satisfactorily, the OWR, DX–SEND dummy box is defective.

## 5–8. Remote Keying Circuit Checkout (AN/GRC–142 and AN/GRC–122 Only)

If the AM–3349/GRC–106 will not key from the remote site (all modes of operation, except continuous wave), the procedure given below will aid in localizing the trouble. This procedure is based on the assumption that local keying is satisfactory.

*a.* Disconnect P3 from the GRA–6 receptacle on the control panel front panel.

*b.* Connect a handset to the GRA–6 receptacle on the control panel front panel and press the handset push-to-talk button.

(1) If the AM–3349/GRC–106 does not key, remove the four knurled screws from the bottom of the control panel and pull it forward. Disconnect cable W18 (W18 is not labeled) from J1 on the control panel. Short circuit pin W18P2 F to ground. If the AM–3349/GRC–106 keys, the control panel is defective. If the AM–3349/GRC–106 does not key, check cable W18.

(2) If AM–3349/GRC–106 does key, reconnect P3 to the GRA–6 receptacle on control panel front panel.

*c.* Place the C–434/GRC LOCAL switch to SET 1. Connect the handset to the AUDIO connector on the C–434/GRC front panel and press the handset push-to-talk button. If the AM–3349/GRC–106 does not key, the C–434/GRC is defective. If AM–3349/GRC–106 does key, remove wires from the L1 and L2 posts of the C–434/GRC front panel and twist them together.

*d.* Remove the field wires from the C–433/GRC binding posts in the shelter dc entrance box. Measure resistance between these two binding posts it should be ½ ohm, or less. If the resistance is not ½ ohm, or less, a defect exists in the shelter wiring; higher category of maintenance is required. If the resistance measurement is satisfactory, reconnect all wires that were removed (*c* and *d* above).

*e.* Visually check field wires going to C–433/GRC at the remote site for breaks.

*f.* Connect the handset to the C–433/GRC AUDIO connector and press the handset push-to-talk button. If the AM–3349/GRC does not key, the C–433/GRC is defective. If the AM–3349/GRC keys, the remote box is defective.

## 5–9. Checkout of Telephone Circuit (TA/312/PT) (AN/GRC–142 or AN/GRC–122 Only)

If trouble is suspected within the telephone circuit, locate the defective item as follows:

*a.* Disconnect the wires from the local TA–312/PT LINE posts and twist them together.

*b.* Disconnect the field wires from the TA–312/PT binding posts in the shelter dc entrance box.

*c.* Measure resistance between the TA–312/PT posts in the shelter dc entrance box. (Control panel AUDIO TEL REMOTE CW switch (where applicable) must be in the TEL position.) The resistance should be approximately ½ ohm.

(1) If the resistance measurement is not satisfactory, disconnect W15P1 from J7 on the control panel and measure the resistance between pins A and B of J7. If resistance is about ½ ohm, the defect is in cable W15 or the dc entrance box; higher category of maintenance is required. If the resistance measurement is not satisfactory, measure the resistance between E1 and E2 on the control panel. If the resistance is not approximately ½ ohm, check the continuity of cable W25 (fig. 6–1). If the resistance is about ½ ohm, disconnect W29P1 from control panel J6. Measure for 28 volts dc between W29P1–C and ground, and continuity between W29P1–A and W29P1–B. If the 28 volts dc and the continuity measurements are satisfactory, the control panel is defective. If the 28 volts dc is absent, the trouble is in the power distribution circuit; higher category of maintenance is required. If the continuity check is unsatisfactory, check to see that interlock switches for the OWR/DX SEND and DX RCV/PONY dummy boxes) S1 and S2 (fig. 6–4) are not open.

(2) If the resistance measurements are satisfactory ((1) above), check the field wires for breaks.

*d.* If the field wires are satisfactory, one of the TA–312/PT's is defective; perform the troubleshooting procedures given in TM 11–5805–201–12.

## 5–10. Checkout of Remote Cw Circuit (AN/GRC–142 and AN/GRC–122 Only)

The following procedure should be followed if remote cw operation is not satisfactory. This procedure assumes that the local cw operation is functioning properly.

*a.* Check the telephone (TA–312/PT) operation. If satisfactory, proceed as follows. If not, check out the telephone circuit (para 5–9).

*b.* Disconnect cables W15 and W18 (W18 is not labeled) from the rear of the control panel. (It may be necessary to lower the control panel by removing the four knurled screws of the control panel to reach the rear connectors.)

*c.* Check to see that the control panel AUDIO TEL REMOTE CW switch (where applicable) is in the REMOTE CW position.

*d.* Check the continuity between J7–A and J1–F, and between J7–B and ground. J7 is located on the control panel.

*e.* If continuity is satisfactory, check cable W18 (fig. 6–1).

*f.* If continuity is not satisfactory, the control panel is defective.

## 5–11. Faulty Transmitting or Receiving Operation Checkout (AN/GRC–142 and AN/GRC–122 Only)

Faulty transmitting or receiving operation may be caused by a defective Radio Set AN/GRC–106; Radio Teletypewriter, Modem MD–522(*)/GRC; Switch Assembly SA–1554/GRC–142 (control panel); or Local Control C–434/GRC. If the equipment is operated from a remote site, the trouble may also be caused by a defective line filter in the dc entrance box, a defective Remote Control C–433/GRC, or remote Interconnecting Box C–7279/GRC–142. If the operational checks fail to isolate the defective unit, attempt to transmit and/or receive signals at each unit in the transmit/receive link, in turn, until the defective unit is located. For this operation, connect Handset H–33/PT to the connectors indicated by the dashed lines in figure 5–1 and use the handset to operate the equipment (transmit or receive) from the point of connection. Before replacing the suspected unit, check the interconnecting cable and connectors for damage, such as broken wires or connector pins. Replacement of the defective unit is accomplished by higher category of maintenance personnel.

## 5–12. DX–RECEIVE Pony Loop Circuit Checkout (AN/GRC–122 Only)

Follow the procedure given below to locate an open circuit within the DX–RECEIVE pony loop (dc loop No. 2). A no-loop current (open circuit) condition is indicated by a zero reading on the MD–522(*)/GRC meter. An open circuit can be caused by a defect in the MD–522(*)/GRC, control panel, dummy box, switchbox, duplex TT–98/FG, or cabling.

**WARNING**

Dangerous voltages (100 volts dc, regulated) exist in the loop circuits. Be extremely careful when working near these circuits.

*a.* Disconnect plug (W11P1) from the TT–98 DX RCV PONY jack on the front of the control panel and observe the loop current indication on the MD–522(*)/GRC meter.

*b.* If no current is present, disconnect cable W13 from the MD–522(*)/GRC front panel and measure 100 volts dc ±20 percent between pins A(+) and C(—) of the MD–522(*)/GRC DC LOOP NO. 2 connector.

(1) Absence of 100 volts dc indicates a defective MD–522(*)/GRC, higher category maintenance is required.

(2) Presence of 100 volts dc indicates a defective cable or control panel. Turn OFF the MD–522(*)/GRC and remove cable W13 from the rear of the control panel. Check the cable for continuity. If continuity is satisfactory, the control panel is defective; higher category of maintenance is required. If no continuity exists, cable W13 defective.

*c.* If current is present, turn off the MD–522(*)/GRC and both inverters. Remove the four bolts from the switchbox front and lower panel to reach the rear connectors. Disconnect cables W3 and W4 and check the continuity as given below. Before making continuity measurements, set all switchbox front panel controls in the up position.

| Cable | Pins | Resistance |
|---|---|---|
| W3P1 | B and C | Approximately 1,500 ohms (depends on setting of TT-98/FG LINE INCREASE rheostat). |
| W4P1 | B and C | Approximately 250 ohms. |

*d.* If the continuity checks above are not satisfactory, check the continuity at the terminal board on the left side of the duplex TT-98/FG. Check continuity only at the terminals corresponding to the cable that has the incorrect continuity reading. Refer to the following chart for this measurement. If continuity is not correct, the duplex TT-98/FG is defective. If continuity measurements are satisfactory, check W3 and W4 (fig. 6-1).

| Cable | Terminal board pins | Resistance |
|---|---|---|
| W3P1 | 2 and 5 | Approximately 1,500 ohms (depends on setting of duplex TT-98/FG LINE INCREASE rheostat). |
| W4P1 | 3 and 4 | Approximately 250 ohms. |

*e.* Disconnect cables W8 and W9 at the switchbox. Check for continuity between the tip of W11P1 and W9P2-B, and between the ring of W11P1 and W8P2-B. If the continuity is satisfactory, the switchbox is defective. If continuity is not satisfactory, check the continuity of cables W8, W9 and W11 against the cable diagram (fig. 6-1). If the cables check satisfactorily, the DX-RECEIVE pony dummy box is defective.

## Section IV. FAULTY OPERATION (AN/GRC-142A, AN/GRC-142B, AN/GRC-122A, AND AN/GRC-122B)

### 5-13. OWR DX-SEND TTY Loop Circuit Checkout (AN/GRC-142A, -142B and AN/GRC-122A, -122B)

Procedures for localization of an open circuit within the OWR DX-SEND TTY loop (dc loop No. 1) are given below. A no-loop current condition is indicated by a zero reading on the MD-522(*)/GRC front panel meter. A no-loop current condition can be caused by a defect in the MD-522(*)/GRC, the switch assembly, the dummy box, the TT-76A/GGC, the TT-98/FG, the TT-523/GGC, or defective cabling.

**WARNING**

Dangerous voltages (100 volts dc) exist in the loop circuits. Be extremely careful when working near these circuits.

*a.* Turn the MD-522(*)/GRC METER FUNCTION switch to DC LOOP No. 1. Disconnect plug (W12P1) from the OWR DX-SEND jack on the front of the switch assembly and observe the loop current indication on the MD-522(*)/GRC meter. Perform the applicable procedures given in *b* below (no current) or *c* below (current present) below.

*b.* If no current is present, disconnect cable W14 from the MD-522(*)/GRC front panel and measure for 100 volts dc ±20 percent between pins A(+) and C(—) of the MD-522(*)/GRC DC LOOP No. 1 connector.

(1) Absence of 100 volts dc indicates a defective MD-522(*)/GRC; higher category of maintenance is required.

(2) Presence of 100 volts dc indicates a defective cable or a defective switch assembly. Turn off the MD-522(*)/GRC. Remove the four bolts that secure the switch assembly to the support channels and rotate the switch assembly to reach cable W14. Disconnect the cable from the switch assembly and check the cable for short circuits and continuity. If the continuity is satisfactory, the switch assembly is defective and higher category of maintenance is required. If there is no continuity, cable W14 is defective.

*c.* If current is present, turn the MD-522(*)/GRC and both inverters off. Remove the four switch assembly mounting bolts (fig. 3-14) and rotate the switch assembly to reach the rear connectors. Disconnect cables W1, W2, W5, and W6 from the switch assembly and check the continuity as given below. Set the TT-76A/GGC SELECTOR switch to position 1, the TT-523/GGC switch to TD SEND, TRD SEND/RCV position, and all switch assembly controls in the up position before making continuity measurements.

| Cable | Pins | Resistance |
|---|---|---|
| W1P1 | B and C | Approximately 10 ohms. |
| W6P1 | B and C | Approximately 250 ohms. |
| W2P1 | B and C | Approximately 1,500 ohms, depending on setting of TT-98/FG LINE INCREASE control. |
| W5P1 | B and C | Approximately 250 ohms. |

*d.* If the continuity checks above are not satisfactory, check the continuity at the terminal board of the TT–98/FG or on the bottom of the TT–76A/GGC. Check continuity only at the terminals that correspond to the cable that has the incorrect continuity reading. Refer to the chart below for this measurement. Unbolt the TT–76A/GGC from its mounting by removing the dust cover and removing the bolt from each corner of the machine base. Tip up the TT–76A/GGC to reach the terminal boards for continuity measurements. Remove the TT–98/FG dust cover to reach the terminal board. If continuity at the TT–98/FG is not correct, the TT–98/FG is defective. If the continuity at the TT–76A/GGC is not correct, the TT–523(*)/GGC may be defective. If replacing the TT–523/(*)GGC does not remedy the trouble, the TT–76A/GGC is defective. If continuity measurements at the TT–76A/GGC and the TT–98/FG are satisfactory, cable W1, W2, W5 or W6 is defective.

| Cable | Terminal board pins | Location | Resistance |
|---|---|---|---|
| W1P1 | 1 and 6 | TT–76A/GGC | Approximately 10 ohms. |
| W6P1 | 4 and 5 | TT–76A/GGC | Approximately 250 ohms. |
| W2P1 | 2 and 5 | TT–98/FG | Approximately 1,500 ohms, depending on setting of TT–98/FG LINE INCREASE control. |
| W5P1 | 3 and 4 | TT–98/FG | Approximately 250 ohms. |

*e.* Disconnect cables W7P2 and W10P2 from the switch assembly. Check for continuity between the tip of W12P1 and W10P2–B, and between the ring of W12P1 and W7P2–B. If there is continuity, the switch assembly is defective. If there is no continuity, check the continuity of cables W7, W12, and W10 against the applicable cable diagram. A defective cable or part requires repair at a higher category of maintenance. If the cables check satisfactorily, the OWR, DX SEND dummy box is defective.

## 5–14. Remote Keying Circuit Checkout (AN/GRC–142A, AN/GRC–142B, AN/GRC–122A, and AN/GRC–122B)

If the AM–3349/GRC–106 will not key from the remote site (all modes of operation, except continuous wave), the procedure given below will aid in localizing the trouble. This procedure is based on the assumption that local keying is satisfactory.

*a.* Disconnect plug P3 from the GRA–6 receptacle (J13) on the switch assembly front panel.

*b.* Connect a handset to the GRA–6 receptacle on the switch assembly front panel and press the handset push-to-talk button.

(1) If the AM–3349/GRC–106 does not key, remove the four switch assembly mounting bolts; pull the unit forward and rotate it to reach the connectors at the rear panel.

(2) Disconnect cable W18 (cable W18 is not labeled) from the rear panel connector J11. Short circuit pin W18P2–F to ground. If the AM–3349/GRC–106 keys, the switch assembly is defective. If the AM–3349/GRC–106 does not key, cable W18 is defective.

(3) If the AM–3349/GRC–106 does key after cable W18 is replaced, reconnect P3 to the GRA–6 receptacle on the switch assembly front panel.

*c.* Place the C–434/GRC LOCAL switch to SET 1. Connect the handset to the AUDIO connector on the C–434/GRC front panel and press the handset push-to-talk button. If the AM–3349/GRC–106 does not key, the C–434/GRC is defective. If AM–3349/GRC–106 does key, remove wires from the L1 and L2 posts of the C–434/GRC front panel and twist them together.

*d.* Remove the field wires from the C–433/GRC binding posts in the shelter power/signal entrance box. Measure resistance between these two binding posts; resistance should be ½ ohm, or less. If

the resistance is not ½ ohm, or less, a defect exists in the shelter wiring; higher category maintenance is required.

*e.* If the resistance measurement is satisfactory, reconnect all wires that were removed (*c* and *d* above).

*f.* Visualy check the field wires going to C–433/GRC for breaks.

*g.* Connect the handset to the C–433/GRC AUDIO connector and press the handset push-to-talk button. If the AM–3349 does not key, the C–433/GRC is defective. If the AM–3349/GRC keys, the remote box is defective.

## 5–15. Checkout of Telephone Circuit (TA–312/PT) (AN/GRC–142A, AN/GRC–142B, AN/GRC–122A, and AN/GRC–122B Only)

If trouble is suspected within the telephone circuit, locate the defective item as follows:

*a.* Disconnect the wires from the local TA–312/PT LINE binding posts and twist them together.

*b.* Disconnect the field wires from the TA–312/PT binding posts in the shelter power/signal entrance box.

*c.* Measure the resistance between the TA–312/PT posts in the shelter entrance box; the resistance should be ½ ohm, or less.

(1) If the resistance measurement is not satisfactory, disconnect W15P1 from J17 on the switch assembly and measure the resistance between pins A and B of J17. If resistance is approximately ½ ohm, the defect is in cable W15 or the dc entrance box; higher category of maintenance is required. If the resistance measurement is not satisfactory, measure the resistance between E1 and E2 on the switch assembly. If the resistance is not ½ ohm, or less, check the continuity of cable W25 (fig. 6–1).

(2) If the resistance and continuity checks are satisfactory ((1) above), check the field wires for breaks.

*d.* If the field wires are satisfactory, one of the TA–312/PT is defective; perform the troubleshooting procedures given in TM 11–5805–201–12.

## 5–16. Checkout of Remote CW Circuit (AN/GRC–142A, 142B and AN/GRC–122A, –122B Only)

The following procedures should be followed if remote cw operation is not satisfactory. Assume that the local cw operation is functioning properly and—

*a.* Remove the cables from the GRA–6 and VOICE–KEY connectors on the front panel of the switch assembly.

*b.* Check for continuity between J13–F (GRA–6 connector) and J12–F (VOICE–KEY connector). Check for continuity between J12–H and ground and from J13–H and ground. If continuity is not satisfactory, the switch assembly is defective. If continuity is satisfactory, proceed as follows:

*c.* Remove the four switch assembly mounting bolts; pull the unit forward and rotate to reach the rear panel connectors.

*d.* Remove cable W18 (cable W18 is not labeled) from connector J11. Check for continuity between connector J11–F and J13–F (GRA–6 connector on front panel), and between J11–H and the switch assembly chassis ground. If continuity is not satisfactory, the switch assembly is defective. If continuity is satisfactory, check cable W18 for continuity (fig. 6–1); if not satisfactory, cable W18 is defective.

*e.* To check the remote key cable (clip mounted on the right side of the switch assembly), jumper the power/signal entrance box REM CW binding posts. Check for continuity between remote key cable plug end terminals F and H. If there is no continuity, higher category of maintenance is required. If there is continuity, check the field wire pair for breaks.

## 5–17. Faulty Transmitting or Receiving Operation Checkout (AN/GRC–142A, –142B, AN/GRC–122A, –122B Only)

Faulty transmitting or receiving operation may be caused by a defective Radio Set AN/GRC–106; Radio Teletypewriter, Modem MD–522(*)/GRC; Switch Assembly SA–1650/GRC; or Local Control C–434/GRC. If the equipment is operated from a remote site, the trouble may also be caused by a defective line filter in the entrance box, broken or shorted field wire pair, a defective Remote Control C–433/GRC, or a remote Interconnecting Box C–7279/GRC–142. If the operational checks fail to isolate the defective unit, attempt to trans-

mit and/or receive signals at each unit in the transmit/receive link, in turn, until the defective unit is located. For this operation, connect Handset H-33/PT to the connectors indicated by the dashed lines in figure 5-2 and use the handset to operate the equipment (transmit or receive) from the point of connection. Before replacing the suspected unit, check the interconnecting cable and connectors for damage, such as broken wires or connector pins. Replacement of the defective unit is accomplished by higher category of maintenance personnel.

## 5-18. DX-RECEIVE Pony Loop TTY Order Wire Circuit Checkout (AN/GRC-122A and AN/GRC-122B Only)

Follow the procedure given below to locate an open circuit within the DX-RECEIVE pony loop (dc loop No. 2). A no-loop current (open circuit) condition is indicated by a zero reading on the MD-522(*)/GRC meter. An open circuit can be caused by a defect in the MD-522(*)/GRC, the switch assembly, the dummy box, the duplex TT-98/FC, or the cabling.

**WARNING**

Dangerous voltages (100 volts dc) exist in the loop circuits. Be extremely careful when working near these circuits.

*a.* Disconnect plug (W11P1) from the TT-98 DX RCV PONY jack on the front of the switch assembly and observe the loop current identification on the MD-522(*)/GRC meter.

*b.* If no current is present, remove cable W13 from the MD-522(*)/GRC front panel LOOP No. 2 receptacle and measure 100 volts dc ±20 percent between pins A(+) and C(—) of the MD-522(*)/GRC DC LOOP No. 2 connector.

(1) Absence of 100 volts dc indicates a defective MD-522(*)/GRC; higher category maintenance is required.

(2) Presence of 100 volts dc indicates a defective cable or switch assembly. Turn off the MD-522(*)/GRC. Disconnect cable W13 at the rear of the switch assembly. Remove the four switch assembly mounting bolts, and pull the unit forward and rotate it to reach the rear panel connectors. Check the cable continuity. If continuity is satisfactory, the switch assembly is defective; higher category maintenance is required. If no continuity exists, cable W13 is defective.

*c.* If current is present, turn off the MD-522(*)/GRC and both inverters. Remove the switch assembly (*b* above). Disconnect cables W3 and W4 and check the continuity as given below.

| *Cable* | *Pins* | *Resistance* |
|---|---|---|
| W3P1 | B and C | Approximately 1,500 ohms (depends on setting of TT-98/FG LINE INCREASE rheostat). |
| W4P1 | B and C | Approximately 250 ohms. |

*d.* If the continuity checks above are not satisfactory, check the continuity at the terminal board on the left side of the duplex TT-98/FG (AN/GRC-122(*) only). Check continuity only at the terminals corresponding to the cable that has the incorrect continuity indication. Refer to the following chart for this measurement. If continuity is not correct, the duplex TT-98/FG is defective. If continuity measurements are satisfactory, check W3 and W4 (fig. 6-1).

| *Cable* | *Terminal board pins* | *Resistance* |
|---|---|---|
| W3P1 | 2 and 5 | Approximately 1,500 ohms (depends on setting of duplex TT-98/FG LINE INCREASE rheostat). |
| W4P1 | 3 and 4 | Approximately 250 ohms. |

*e.* Disconnect cables W8 and W9 at the switch assembly. Check for continuity between the tip of W11P1 and W9P2-B, and between the ring of W11P1 and W9P2-B. If the continuity is satisfactory, the switch assembly is defective. If continuity is not satisfactory, check the continuity of cables W8, W9, and W11 against the applicable cable diagram (fig. 6-1). If the cables check satisfactorily, the DX-RECEIVE pony dummy box is defective.

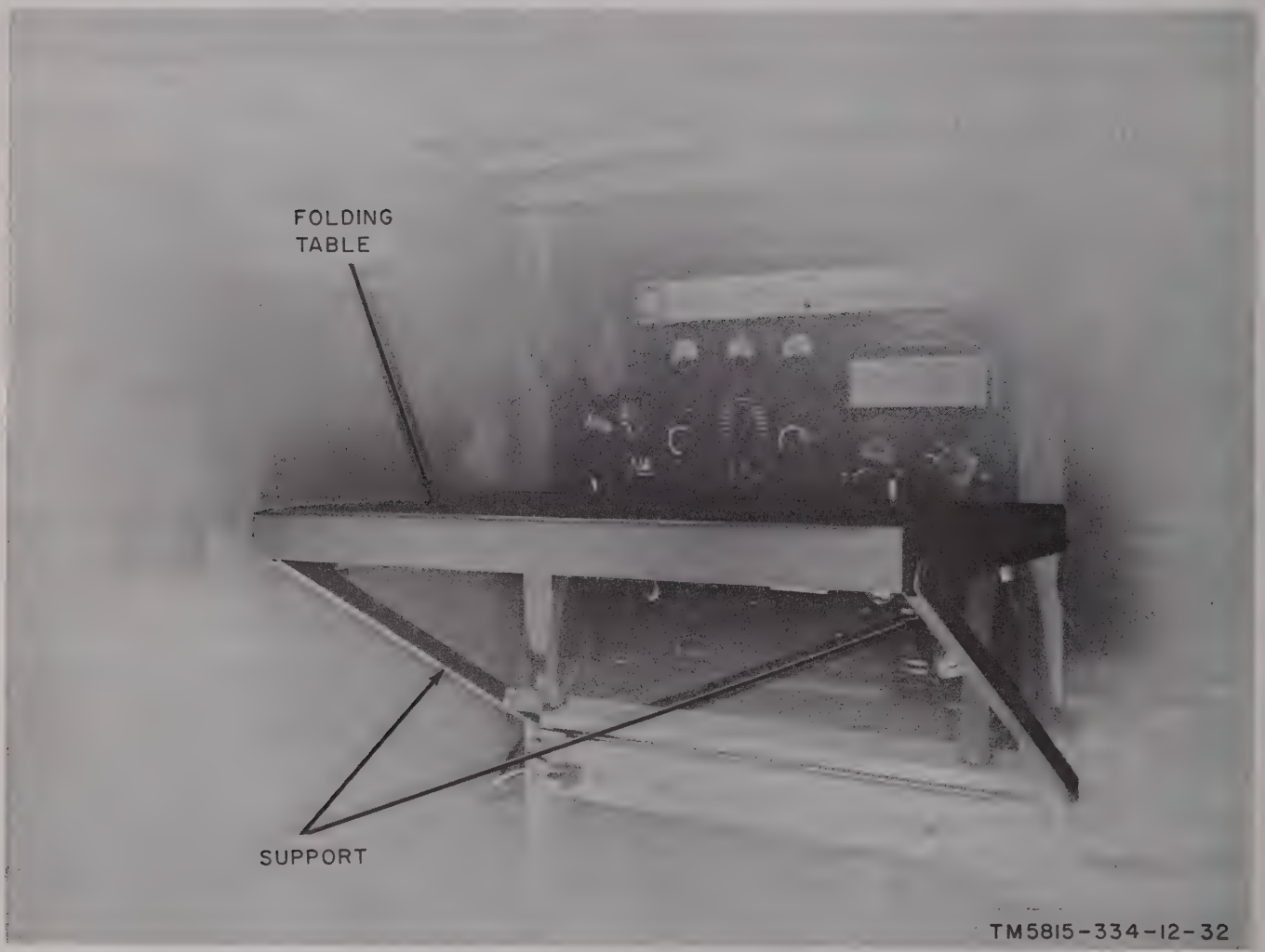


*Figure 5–3. Radio Teletypewriter Set AN/GRC–142, or AN/GRC–122, folding table installed for use as maintenance aid.*

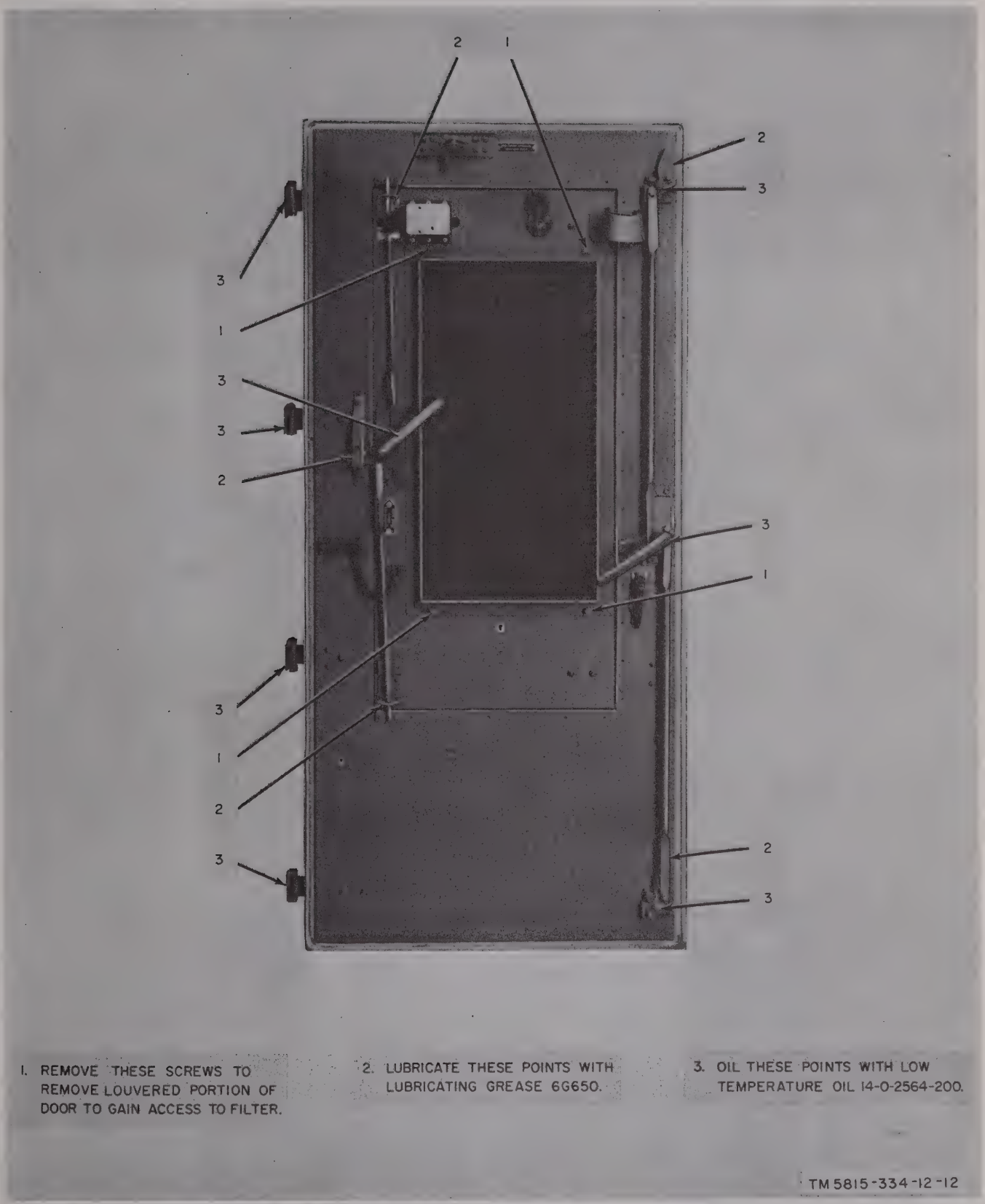


*Figure 5–4. Shelter door, filter removal and lubrication details (typical of AN/GRC–142 or AN/GRC–122 and AN/GRC–142A or AN/GRC–122A, serial number 1–118).*

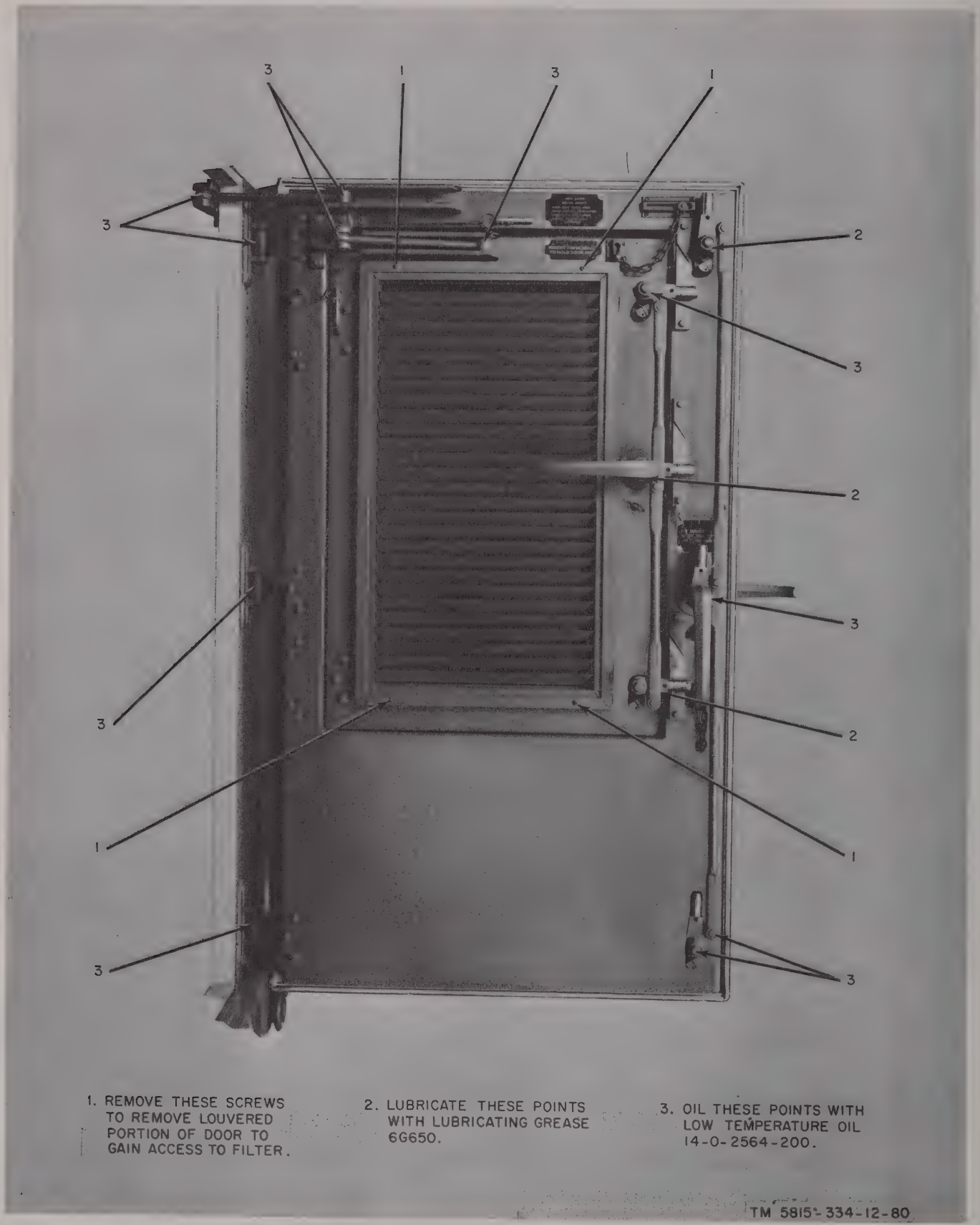


*Figure 5–5. Radio Teletypewriter Set AN/GRC–142B, or AN/GRC–122B, shelter door, filter removal and lubrication details.*

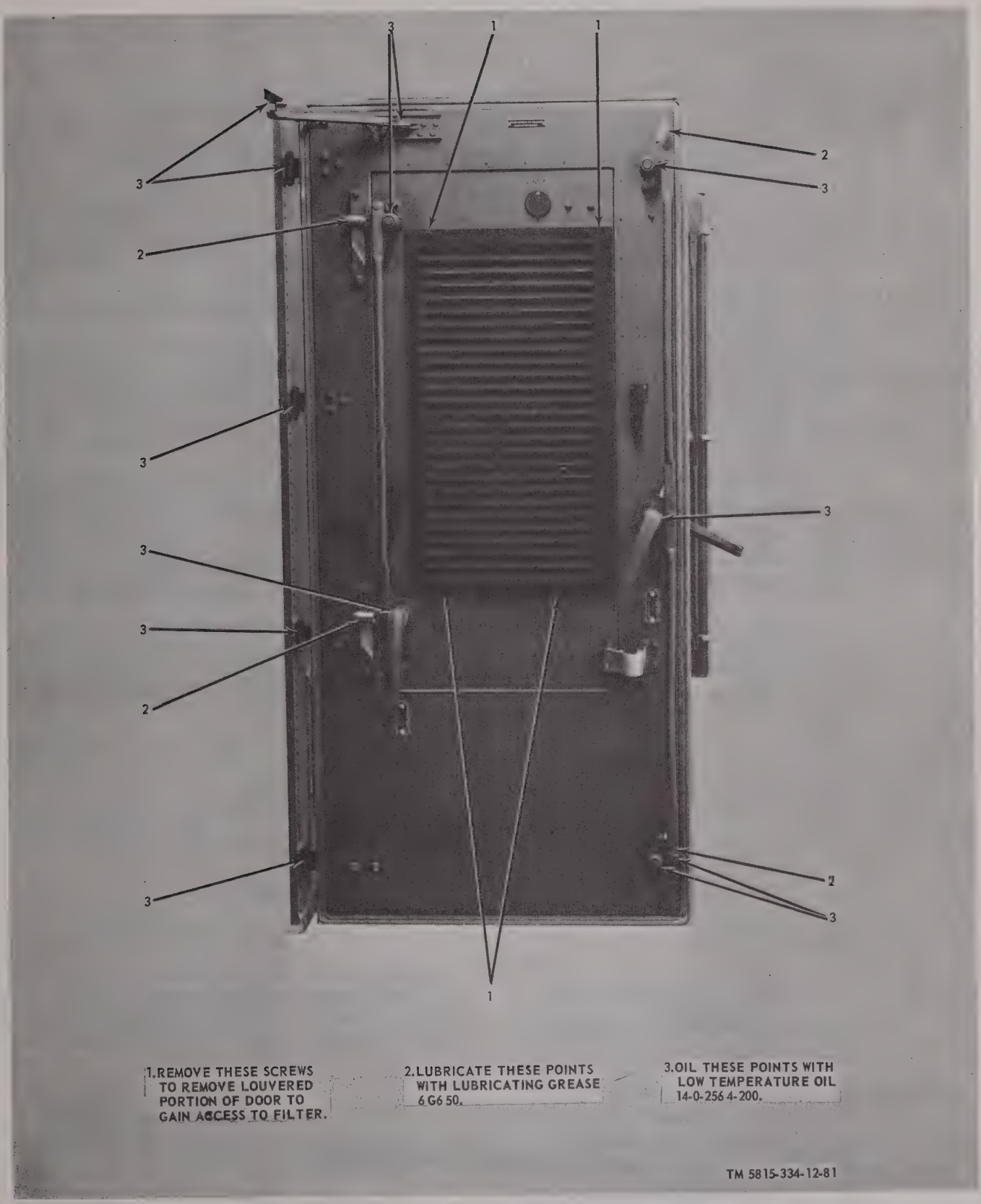


*Figure 5–6. Shelter S–318A door, filter removal and lubrication details (typical of AN/GRC–142A, or AN/GRC–122A serial numbers 119 and up, or AN/GRC–142B, –122B configurations).*

# Chapter 6

# SHIPMENT, LIMITED STORAGE, AND DEMOLITION OF MATERIEL TO PREVENT ENEMY USE

## Section I. SHIPMENT AND LIMITED STORAGE

### 6-1. Disassembly of Equipment

Perform the operations given below when the AN/GRC-142(*) or AN/GRC-122(*) is being moved to a different location, or placed in storage.

*a.* Turn off all equipment power switches and circuit breakers.

*b.* Remove the batteries from the TA-312/PT's and the AN/GRA-6's for prolonged storage and long-distance shipment.

*c.* Secure all component items in their cases, mountings, holders, or racks.

*d.* Place the miscellaneous items in the storage cabinets and secure the cabinets for transit.

*e.* Disconnect all field wires from the entrance box.

*f.* Disconnect the dc power cable from the entrance box.

*g.* Disconnect the ac power cable from the entrance box, if connected.

*h.* Remove and disconnect ground rods and secure them to the side of the shelter.

*i.* Close and secure all ventilator and exhaust covers.

*j.* Disconnect and disassemble antennas, and store them in the shelter.

*k.* Remove fuel from the fuel can.

*l.* Refer to the applicable technical manual for storage procedures pertaining to the various major components, such as the AN/GRC-106, the MD-522(*)/GRC; teletypewriters, the heater, and the air conditioner.

*m.* Recheck the area for loose items.

*n.* Clean the shelter thoroughly.

*o.* Close and lock the shelter door.

### 6-2. Transportation

The AN/GRC-142(*) or AN/GRC-122(*) can be transported by truck or by helicopter. Refer to paragraph 2-6 for lifting and loading instructions.

## Section II. DEMOLITION TO PREVENT ENEMY USE

### 6-3. Authority for Demolition

Demolition of the equipment will be accomplished only upon the order of the commander. The destruction procedures outlined in paragraph 6-4 will be used to prevent further use of the equipment.

### 6-4. Methods of Destruction

*a.* Destroy the equipment in the following order:

(1) Secure or cryptographic equipment.

(2) AN/GRC-106.

(3) MD-522(*)/GRC.

(4) Duplex RT-622/GRC (AN/GRC-122(*) only).

(5) Teletypewriter equipment.

(6) Technical manuals.

(7) Remainder of equipment as desired.

*b.* Use any or all of the following methods to destroy the equipment:

(1) *Smash.* Smash the controls, tubes, coils, relays, switches, and meters; use sledges, axes, handaxes, pickaxes, hammers or crowbars.

(2) *Cut.* Cut all cables and cords and slash the wiring on the components; use axes, handaxes, or machetes.

**WARNING**

Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.

(3) *Burn.* Burn cords and technical manuals; use gasoline, kerosene, oil, flamethrowers, or incendiary grenades.

(4) *Bend.* Bend panels, antenna components, and cabinets.

(5) *Explode.* If explosives are necessary, use firearms, grenades, or TNT.

(6) *Dispose.* Bury or scatter the destroyed parts in slit trenches or foxholes, or throw them into streams.

# APPENDIX A

# REFERENCES

Following is a list of references applicable and available to the unit repairman of Radio Teletypewriter Set AN/GRC-142(*) and AN/GRC-122(*). (These manuals are supplied with the AN/GRC-142(*) and AN/GRC-122(*).)

| | |
|---|---|
| DA Pam 310-4 | Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders. |
| DA Pam 310-7 | U.S. Army Equipment Index of Modification Work Orders. |
| TB SIG 291 | Safety Measures to be Observed When Installing and Using Whip Antennas, Field Type Masts, Towers, Antennas, and Metal Poles That Are Used With Communication, Radar, and Direction Finder Equipment. |
| TB 750-240 | Maintenance and Repair Procedures for: S-141/G, S-144/G, S-250/G, S-280/G, and S-318/G Type Shelters. |
| TM 5-4520-211-14 | Operator, Organizational, DS, GS Maintenance Manual, Including Repair Parts and Special Tool Lists: Heater, Space, Fuel Oil and Gasoline, 15,000 Btu/Hr Output, Dc 24V (Hupp Model MH15B3C-1) FSN 4520-878-9393. |
| TM 5-4520-236-14 | Operator, Organizational, Direct Support and General Support Maintenance Manual: Heater, Space, Portable: Air Circulating Type, Multifuel, Gasoline; 15,000 Btu/Hr; Electric Motor Driven Blower (Hunter Manufacturing Co. Model UH48B, Type III). |
| TM 11-5038 | Control Group AN/GRA-6 (TO 16-30GRA6-5). |
| TM 11-5805-201-12 | Operator and Organizational Maintenance Manual Including Repair Parts and Special Tool Lists Telephone Set TA-312/PT. (TO 31LO1-2PT-291). |
| TM 11-5805-387-15-1 | Organizational, DS, GS, and Depot Maintenance Manual: Modem, Radio Teletypewriter MD-522/GRC. |
| TM 11-5805-387-15-2 | Organizational, DS, GS, and Depot Maintenance Manual: Modem, Radio Teletypewriter Model MD-522A/GRC. |
| TM 11-5805-387-20P-1 | Organizational Maintenance Repair Parts and Special Tools List: Modem, Radio Teletypewriter MD-522/GRC. |
| TM 11-5805-387-20P-2 | Organizational Repair Parts List: Modem, Radio Teletypewriter MD-522A/GRC. |
| TM 11-5815-200-12 | Operators and Organizational Maintenance Manual Including Repair Parts and Special Tool Lists: Teletypewriter Sets AN/FGC-20, AN/FGC-20X, AN/FGC-21, AN/FGC-64, AN/FGC-66, AN/FGC-67, AN/FGC-67X, AN/UGC-4, AN/UGC-29, AN/UGC-29X, TT-259/FGC, and Teleprinter TT-259/FG. |
| TM 11-5815-238-12 | Organizational Maintenance Manual, Including Repair Parts and Special Tools List: Teletypewriter Sets AN/GGC-3 and AN/GGC-3A and Teletypewriter Reperforator-Transmitters TT-76/GGC, TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC. |
| TM 11-5815-338-15 | Operator, Organizational, DS, GS, and Depot Maintenance Manual Including Repair Parts and Special Tool Lists: Device, Low-Level Signaling TT-523/GGC and TT-532A/GGC. |
| TM 11-5820-467-15 | Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Antenna Group AN/GRA-50. |

| | |
|---|---|
| TM 11-5820-467-25P | Organizational, DS, GS, and Depot Maintenance Repair Parts and Special Tool Lists: Antenna Group AN/GRA-50. |
| TM 11-5820-489-20P | Organizational Maintenance Repair Parts and Special Tool Lists: Control Group AN/GRA-6. |
| TM 11-5820-520-12 | Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tool Lists: Radio Set AN/GRC-106. |
| TM 11-5820-765-12 | Operator and Organizational Maintenance Manual: Power Supplies PP-4763/GRC and PP-4763A/GRC. |
| TM 11-5965-222-14P | Operator, Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools): Dynamic Loudspeaker LS-166/U, FSN 5965-243-6420. |
| TM 11-5965-244-15P | Operator, Organizational, Field and Depot Maintenance Repair Parts and Special Tool Lists: Handset H-111/U. |
| TM 11-6625-203-12 | Operator and Organizational Maintenance: Multimeter AN/URM-105, Including Multimeter ME-77/U. |
| TM 11-6625-333-15 | Operators, Organizational, DS, GS, and Depot Maintenance Manual Including Repair Parts and Special Tools List: Standing-Wave-Ratio Power Meter ME-165/G. |
| TM 38-750 | The Army Maintenance Management System (TAMMS). |

# APPENDIX B
# MAINTENANCE ALLOCATION

## Section I. INTRODUCTION

### B-1. General

This appendix provides a summary of the maintenance operations for the AN/GRC-142(*) and AN/GRC-122(*). It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

### B-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

*a. Inspect.* To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

*b. Test.* To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

*c. Service.* Operations required periodically to keep an item in proper operating condition; i.e, to clean, preserve, drain, paint, or to replenish fuel /lubricants/hydraulic fluids or compressed air supplies.

*d. Adjust.* Maintain within prescribed limits by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

*e. Align.* To adjust specified variable elements of an item to about optimum or desired performance.

*f. Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipment used in precision measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

*g. Install.* The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment/system.

*h. Replace.* The act of substituting a serviceable like-type part, subassembly, model (component or assembly) for an unserviceable counterpart.

*i. Repair.* The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module/component/assembly, end item or system.

*j. Overhaul.* That periodic maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (e.g., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like-new condition.

*k. Rebuild.* Consists of those services/actions necessary for the restoration of unserviceable equipment to a like-new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipment/components.

### B-3. Column Entries

*a. Column 1, Group Number.* Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

*b. Column 2, Component/Assembly.* Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

*c. Column 3, Maintenance Functions.* Column 3 lists the functions to be performed on the item listed in column 2.

*d. Column 4, Maintenance Category.* Column 4 specifies, by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "worktime" figures will be shown for each category. The number of man-hours specified by the "worktime" figure repre-

sents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

C — Operator/Crew
O — Organizational
F — Direct Support
H — Genersl Support
D — Depot

*e. Column 5, Tools and Equipment.* Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

## B-4. Tool and Test Equipment Requirements (Table 1)

*a. Tool or Test Equipment Reference Code.* The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

*b. Maintenance Category.* The codes in this column indicate the maintenance category allocated the tool or test equipment.

*c. Nomenclature.* This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

*d. National/NATO Stock Number.* This column lists the National/NATO stock number of the specific tool or test equipment.

*e. Tool Number.* This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for Manufacturers (5-digit) in parentheses.

(Next printed page is B-3)

## SECTION II MAINTENANCE ALLOCATION CHART FOR

RADIO TELETYPEWRITER SETS AN/GRC-142(*) AND AN/GRC-122(*)

| (1) GROUP NUMBER | (2) COMPONENT/ASSEMBLY | (3) MAINTENANCE FUNCTION | (4) MAINTENANCE CATEGORY | | | | | (5) TOOLS AND EQUIPMENT |
|---|---|---|---|---|---|---|---|---|
| | | | C | O | F | H | D | |
| 00 | RADIO TELETYPEWRITER SET AN/GRC-122(*) AND AN/GRC-142(*) | Inspect[1] | 0.3 | | | | | |
| | | Inspect[2] | | 0.6 | | | | |
| | | Test[3] | 0.3 | | | | | |
| | | Test[4] | | 1.0 | | | | 2 |
| | | Test[5] | | | 2.0 | | | 5 |
| | | Service[6] | 0.5 | | | | | |
| | | Service[7] | | 1.5 | | | | |
| | | Adjust | | 0.3 | | | | |
| | | Repair[8] | | 0.2 | | | | 1 |
| | | Repair[9] | | | 2.0 | | | 3,4,5,6 |
| | | Overhaul | | | | 40.0 | | 3,4,5,6 |
| | | Rebuild | | | | | 80.0 | 3,4,5,6 |
| 01 | CONTROL GROUP AN/GRA-6[10] | Replace | | | 0.5 | | | 3,4 |
| 02 | MODEM MD-5226/GRC[11] | Install | | | 1.0 | | | 3,4 |
| 03 | RADIO SET AN/GRC-106()12 | Replace | | | 1.0 | | | 3,4 |
| 04 | TELEPHONE TA-312/PT[13] | Replace | | | 0.5 | | | 3,4 |
| 05 | TELETYPEWRITER SET TT-98/FG[14] | Replace | | | 1.0 | | | 3,4 |
| 06 | REPERFORATOR TRANSMITTER TELETYPEWRITER TT-76/GRC[15] | Replace | | | 1.0 | | | 3,4 |
| 07 | POWER SUPPLY PP-4763()/GRC[16] | Replace | | | 1.0 | | | 3,4 |
| 08 | STANDING WAVE RATIO POWER METER ME-165()/GRC[17] | Replace | | | 1.0 | | | 3,4 |
| 09 | LOW LEVEL SIGNALING DEVICE TT-523()/GGC[18] | Replace | | | 0.5 | | | 3,4 |
| 10 | ANTENNA GROUP AN/GRA-50[19] | Replace | | | 0.5 | | | 3,4 |
| 11 | DYNAMIC LOUDSPEAKER LS-166/U[20] | Replace | | | 0.5 | | | 3,4 |
| 12 | HANDSET H-111/U[21] | Replace | | | 0.2 | | | 3,4 |
| 13 | MOTOR GENERATOR PU-724/G[22] | Replace | | | 1.0 | | | 3,4 |
| 14 | AIR CONDITIONER[23] | Replace | | | 8.0 | | | 3,4 |
| 15 | HEATER[24] | Replace | | | 4.0 | | | 3,4 |
| 16 | CABLE ASSEMBLIES | Inspect[1] | 0.1 | | | | | |
| | | Test | | 0.5 | | | | 1 |
| | | Service | 0.5 | | | | | |
| | | Replace | | | 1.0 | | | 3,4 |
| | | Repair | | | | | 1.0 | 3,4 |
| 17 | REMOTE CONTROL ASSY C-7279/GRC-142 | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.3 | | | | |
| | | Test | | 0.3 | | | | 1 |
| | | Service[1] | | 0.3 | | | | |
| | | Replace | | 0.1 | | | | |
| | | Repair | | | 1.0 | | | 3,4 |
| | | Overhaul | | | | 2.0 | | 3,4 |
| | | Rebuild | | | | | 3.0 | 3,4 |

See footnotes at end of chart.

## SECTION II MAINTENANCE ALLOCATION CHART FOR

RADIO TELETYPEWRITER SETS AN/GRC-142(*) AND AN/GRC-122(*)

| (1) GROUP NUMBER | (2) COMPONENT/ASSEMBLY | (3) MAINTENANCE FUNCTION | (4) MAINTENANCE CATEGORY | | | | | (5) TOOLS AND EQUIPMENT |
|---|---|---|---|---|---|---|---|---|
| | | | C | O | F | H | D | |
| 18 | POWER DISTRIBUTION PANEL SB-3018/GRC (AN/GRC-142/122 ONLY) | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.2 | | | | |
| | | Test[3] | 0.1 | | | | | |
| | | Test | | | 0.5 | | | 5 |
| | | Service[6] | 0.2 | | | | | |
| | | Service | | 0.6 | | | | |
| | | Replace | | | 1.0 | | | 3,4 |
| | | Repair[8] | | 0.2 | | | | 1 |
| | | Repair | | | 1.0 | | | 3,4 |
| | | Overhaul | | | | 4.0 | | 3,4 |
| | | Rebuild | | | | | 8.0 | 3,4 |
| 19 | POWER DISTRIBUTION PANEL SB-3358/GRC (AN/GRC-142A, -122A, -142B, -122B ONLY) | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.2 | | | | |
| | | Test[3] | 0.1 | | | | | |
| | | Test | | | 0.4 | | | 5 |
| | | Service[6] | 0.2 | | | | | |
| | | Service | | 0.3 | | | | |
| | | Replace | | | 1.0 | | | 3,4 |
| | | Repair | | | 1.0 | | | 3.4 |
| | | Overhaul | | | | 4.0 | | 3.4 |
| | | Rebuild | | | | | 8.0 | 3,4 |
| 20 | SWITCH ASSEMBLY SA-1554/GRC-1 & 2 (AN/GRC-142, -122 ONLY) | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.2 | | | | |
| | | Test[3] | 0.1 | | | | | |
| | | Test | | | 0.4 | | | 5 |
| | | Service[6] | 0.2 | | | | | |
| | | Service | | 0.3 | | | | |
| | | Replace | | | 1.0 | | | 3,4 |
| | | Repair[8] | | 0.2 | | | | |
| | | Repair | | | 1.0 | | | 3,4 |
| | | Overhaul | | | | 4.0 | | 3,4 |
| | | Rebuild | | | | | 8.0 | |
| 21 | SWITCH BOX SA-1555/GRC-142 (AN/GRC-142, -122 ONLY) | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.2 | | | | |
| | | Test[3] | 0.1 | | | | | |
| | | Test | | | 0.4 | | | 5 |
| | | Service[6] | 0.2 | | | | | |
| | | Service | | 0.3 | | | | |
| | | Replace | | | 1.0 | | | 3,4 |
| | | Repair | | | 1.0 | | | 3,4 |
| | | Overhaul | | | | 4.0 | | 3,4 |
| | | Rebuild | | | | | 8.0 | 3,4 |
| 22 | SWITCH ASSEMBLY ASSEMBLY SA-1650/GRC (AN/GRC-1 & 2A, -142B, -122A, -122B ONLY) | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.2 | | | | |
| | | Test[3] | 0.1 | | | | | |
| | | Test | | | 0.5 | | | 5 |
| | | Service[6] | 0.2 | | | | | |
| | | Service | | 0.3 | | | | |
| | | Replace | | | 1.0 | | | 3,4 |
| | | Repair[25] | | 0.1 | | | | 1 |
| | | Repair | | | 1.0 | | | |
| | | Overhaul | | | | 4.0 | | 3,4 |
| | | Rebuild | | | | | 8.0 | 3,4 |

See footnotes at end of chart.

## SECTION II MAINTENANCE ALLOCATION CHART FOR

RADIO TELETYPEWRITER SETS AN/GRC-142(*) AND AN/GRC-122(*)

| (1) GROUP NUMBER | (2) COMPONENT/ASSEMBLY | (3) MAINTENANCE FUNCTION | (4) MAINTENANCE CATEGORY | | | | | (5) TOOLS AND EQUIPMENT |
|---|---|---|---|---|---|---|---|---|
| | | | C | O | F | H | D | |
| 23 | POWER TERMINAL ASSEMBLY (AN/GRC-142A, -142B, ONLY) | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.3 | | | | |
| | | Test[3] | 0.1 | | | | | |
| | | Test | | | 0.5 | | | 5 |
| | | Service[6] | 0.2 | | | | | |
| | | Service | | 0.3 | | | | |
| | | Replace | | | 1.0 | | | 3,4 |
| | | Repair | | | 1.0 | | | 3,4 |
| | | Overhaul | | | | 4.0 | | 3,4 |
| | | Rebuild | | | | | 8.0 | 3,4 |
| 24 | AC ENTRANCE BOX (AN/GRC-142 -122 ONLY) | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.3 | | | | |
| | | Test[3] | 0.1 | | | | | |
| | | Test | | | 0.4 | | | 5 |
| | | Service[6] | 0.2 | | | | | |
| | | Service | | 0.3 | | | | |
| | | Replace | | | 1.0 | | | 3,4 |
| | | Repair | | | 1.0 | | | 3,4 |
| | | Overhaul | | | | 4.0 | | 3,4 |
| | | Rebuild | | | | | 8.0 | 3,4 |
| 25 | DC ENTRANCE BOX (AN/GRC-142, -122 ONLY) | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.3 | | | | |
| | | Test[3] | 0.1 | | | | | |
| | | Test | | | 0.4 | | | 5 |
| | | Service[6] | 0.2 | | | | | |
| | | Service | | 0.3 | | | | |
| | | Replace | | | 1.0 | | | 3,4 |
| | | Repair | | | 1.0 | | | 3,4 |
| | | Overhaul | | | | 4.0 | | 3,4 |
| | | Rebuild | | | | | 8.0 | 3,4 |
| 26 | AC-DC DISTRIBUTION BOX (AN/GRC-142, -122 ONLY) | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.3 | | | | |
| | | Test[3] | 0.1 | | | | | |
| | | Test | | | 0.3 | | | 5 |
| | | Service[6] | 0.2 | | | | | |
| | | Service | | 0.3 | | | | |
| | | Replace | | | 1.0 | | | 3,4 |
| | | Repair | | | 1.0 | | | 3,4 |
| | | Overhaul | | | | 4.0 | | 3,4 |
| | | Rebuild | | | | | 8.0 | 3,4 |

See footnotes at end of chart.

SECTION II MAINTENANCE ALLOCATION CHART
FOR

RADIO TELETYPEWRITER SETS AN/GRC-142(*) AND AN/GRC-122(*)

| (1) GROUP NUMBER | (2) COMPONENT/ASSEMBLY | (3) MAINTENANCE FUNCTION | (4) MAINTENANCE CATEGORY | | | | | (5) TOOLS AND EQUIPMENT |
|---|---|---|---|---|---|---|---|---|
| | | | C | O | F | H | D | |
| 27 | INTERCONNECTING BOX J-2728/GRC-162 | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.3 | | | | |
| | | Test[3] | 0.1 | | | | | |
| | | Test | | | 0.2 | | | 5 |
| | | Service[6] | 0.2 | | | | | |
| | | Service | | 0.3 | | | | |
| | | Replace | | 0.1 | | | | |
| | | Repair | | | 0.5 | | | 3,4 |
| | | Ovehaul | | | | 2.0 | | |
| | | Rebuild | | | | | 4.0 | |
| 28 | POWER/SIGNAL ENTRANCE BOX (AN/GRC-142A,- 142B, -122A, -122B ONLY) | Inspect[1] | 0.1 | | | | | |
| | | Inspect | | 0.3 | | | | |
| | | Test[3] | 0.1 | | | | | |
| | | Test | | | 0.5 | | | 5 |
| | | Service[6] | 0.2 | | | | | |
| | | Service | | 0.3 | | | | |
| | | Replace | | | 1.0 | | | 3,4 |
| | | Repair | | | 1.0 | | | 3,4 |
| | | Ovehaul | | | | 4.0 | | 3,4 |
| | | Rebuild | | | | | 8.0 | 3,4 |

(1) Exterior only.
(2) Connectors and cables to shelter.
(3) Operational testing only.
(4) Shelter cabling.
(5) All tests.
(6) Preventive maintenance only.
(7) All servicing.
(8) By replacement of knobs and fuses.
(9) All repairs.
(10) See separate MAC in TM 11-5038.
(11) See separate MAC in TM 11-5805-387-15-1 for MD-522/GRC and TM 11-5805-587-15-2 for MD-522A/GRC.
(12) See separate MAC in TM 11-5820-520-12.
(13) See separate MAC in TM 11-5805-201-12.
(14) See separate MAC in TM 11-5815-200-12.
(15) See separate MAC in TM 11-5815-238-12.
(16) See separate MAC in TM 11-5820-765-12.
(17) See separate MAC in TM 11-6625-333-15.
(18) See separate MAC in TM 11-5815-338-15.
(19) See separate MAC in TM 11-5820-467-15.
(20) See repair parts list in TM 11-5965-222-14P.
(21) See separate MAC in TM 11-5965-244-15P.
(22) See separate MAC in TM 11-6125-252-15.
(23) Supported by TROSCOM.
(24) See separate MAC in TM 5-4520-211-14 or TM 5-4520-236-14.
(25) By replacement of indicator light only.

TABLE 1. TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR

RADIO SETS AN/GRC-142(*) AND AN/GRC-122(*)

| TOOL OR TEST EQUIPMENT REF CODE | MAINTENANCE CATEGORY | NOMENCLATURE | NATIONAL/NATO STOCK NUMBER | TOOL NUMBER |
|---|---|---|---|---|
| 1 | O | TOOL KIT, ELECTRONIC EQUIPMENT TK-101/G | 5180-00-064-5178 | |
| 2 | O | MULTIMETER AN/URM-105 | 6625-00-581-2036 | |
| 3 | F,H,D | TOOL KIT, ELECTRONIC EQUIPMENT TK-100/G | 5180-00-605-0079 | |
| 4 | F,H,D | TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G | 5180-00-610-8177 | |
| 5 | F,H,D | MULTIMETER TS-352B/U | 6625-00-553-0142 | |
| 6 | O,F,H,D | WRENCH 10 INCH | 5120-00-449-8083 | |

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## SECTION II BASIC ISSUE ITEMS (CONTINUED)

| (1) SMR CODE | (2) FEDERAL STOCK NUMBER | (3) DESCRIPTION<br>Reference Number & Mfr Code | USABLE ON CODE | (4) UNIT OF MEAS | (5) QTY INC IN UNIT | (6) QTY FURN WITH EQUIP | (7) ILLUSTRATIONS (a) FIG. NO. | (7) ILLUSTRATIONS (b) ITEM NO. OR REFERENCE DESIGNATION |
|---|---|---|---|---|---|---|---|---|
| | 6625-682-4464 | STANDING WAVE RATIO-POWER METER ME-165/G: (1 ea) | 1,4<br>2,3,5,6 | | | | 1-5<br>1-6 | |
| | 5915-937-6113 | SWITCH ASSEMBLY SA-1554/GRC-142 (Control Panel): (1 ea) | 1,4 | | | | 1-1 | |
| | 5930-937-5352 | SWITCH BOX SA-1555/GRC-142: (1 ea) | 1,4 | | | | 1-1 | |
| | 5815-220-5255 | SWITCH ASSEMBLY SA-1650/GRC: (1 ea) | 2,3,5,6 | | | | 1-2 | |
| | | TAPE, MEASURING RF: SC-A-46858 (80063) (1 ea) | 1,2,3,4,5,6 | | | | | |
| | 5820-937-5530 | TARPAULIN: MI (36800) (1 ea) | 1,4<br>2,3,5,6 | | | | 1-18<br>2-4 | |
| | 5805-543-0012 | TELEPHONE TA-312/PT: (2 ea) | 1,4<br>2,3,5,6 | | | | 1-1<br>1-2 | |
| | 5815-503-2764 | TELETYPEWRITER TT-98B/FG:<br>Note: Usable on code 1,2,3 (1 ea); Usable on code 4,5,6 (2 ea) | 1,4<br>2,3,5,6 | | | | 1-1<br>1-2 | |
| | | THERMOSTAT: SM-D-613001-1 (80063) (1 ea) | 1,2,3,4,5,6 | | | | 1-4 | |
| | | TECHNICAL MANUAL TM11-5815-334-12 | 1,2,3,4,5,6, | ea | 1 | 1 | 1-19 | |
| | | Requisition though pinpoint account number if assigned; otherwise though nearest Adjutant General facility. | | | | | | |
| | | For technical manuals the quantity indicates the maximum number of copies authorized for packing (or issue) with the equipment. Where a number of these equipments are concentrated in a small area, the quantity on hand may be reduced to practical levels. | | | | | | |
| | | OPERATOR/CREW REPAIR PARTS, ACCESSORIES, TOOLS AND TEST EQUIPMENT. | | | | | | |
| P-C | 5920-851-9476 | FUSE, CARTRIDGE: F02B32V5A (81349) | 1,4 | ea | 2 | 10 | 3-1 | |
| P-C | 5920-727-1452 | FUSE, CARTRIDGE: F03B32V10A (81349) | 1,4 | ea | 1 | 5 | 3-1 | |
| P-C | 5920-755-3656 | FUSE, CARTRIDGE: F03B32V30A (81349) | 1,4 | ea | 2 | 10 | 3-1 | |
| P-C | 5920-199-9498 | FUSE, CARTRIDGE: F02B250V-1/2A (81349) | 1,4 | ea | 1 | 5 | 3-1 | |
| P-C | 5920-280-4960 | FUSE, CARTRIDGE: F02A250V2A (81349) | 2,3,5,6 | ea | 5 | 10 | 3-1 | |
| P-C | 5120-935-0703 | HAMMER, SLEDGE: 15H (79796) | 1,4<br>2,3,5,6 | ea | | 1 | 1-7<br>1-18 | |
| P-C | 6240-223-9100 | LAMP INCANDESCENT: NE-51 (81349) | 1,2,3,4,5,6 | ea | 1 | 3 | 1-2 | |
| P-C | 6240-155-7836 | LAMP INCANDESCENT: MS25237-327 (96906) | 1,2,3,4,5,6 | ea | 1 | 3 | 1-2 | |
| P-C | 6240-155-8651 | LAMP INCANDESCENT: MS15586-7 (96906) | 1,2,3,4,5,6 | ea | 2 | 5 | 1-2 | |
| P-C | | LANTERN , HAND: SM-C-350209 (80063) | 1,2,3,4,5,6 | ea | | 1 | | |
| P-C | 7530-223-7966 | PAPER, TELETYPEWRITER: SM-B-603214 (80063) | 1,2,3,4,5,6 | ea | 4 | 4 | | |
| P-C | | PLIERS COMBINATION: 137 (55719) | 1,2,3,4,5,6, | ea | | 1 | | |
| P-C | 4020-073-3276 | ROPE: SM-B-500418 (80063) | 2,3,5,6 | ea | | 2 | | |
| P-C | | SHEATH ANTENNA: SM-D-500428 (80063) | 1,2,3,4,5,6 | ea | | 1 | | |
| P-C | | SCREWDRIVER 4in: MS15224-4 (96906) | 1,2,3,4,5,6 | ea | | 1 | | |
| P-C | | SCREWDRIVER 6 in: MS15224-6 (96906) | 1,2,3,4,5,6 | ea | | 1 | | |
| P-C | 7530-634-6237 | TAPE, BLANK REORDING, TELETYPEWRITER: SM-D-613000-2 (80063) | 1,2,3,4,5,6 | ea | | 1 | | |
| P-C | 6625-089-7166 | VOLTMETER ME-345/GRC-142: | 1,4 | ea | | 1 | 1-22 | |
| P-C | | WRENCH ADJUSTABE: D76 (55719) | 1,2,3,4,5,6 | ea | | 1 | | |
| P-C | 5120-226-5790 | WRENCH, OPEN END: VS1618 (55719) | 1,2,3,4,5,6 | ea | | 2 | | |
| P-C | | WRENCH SET HEXAGON: AW-1015KC (55719) | 1,2,3,4,5,6 | ea | | 1 | | |

## SECTION II BASIC ISSUE ITEMS (CONTINUED)

| (1) SMR CODE | (2) FEDERAL STOCK NUMBER | (3) DESCRIPTION<br>Reference Number & Mfr Code | USABLE ON CODE | (4) UNIT OF MEAS | (5) QTY INC IN UNIT | (6) QTY FURN WITH EQUIP | (7) ILLUSTRATIONS (a) FIG. NO. | (7) ILLUSTRATIONS (b) ITEM NO. OR REFERENCE DESIGNATION |
|---|---|---|---|---|---|---|---|---|
| P-C | 5120 | WRENCH SET OPEN-END: OE-16-18 (55719) | 1,2,3,4,5,6 | ea | | 1 | | |
| | | THE FOLLOWING ITEMS AND THEIR QUANTITIES ARE MOUNTED, IN OR ON EQUIPMENTS FOR STORAGE PURPOSES. | | | | | | |
| P-C | 5975-224-5260 | ROD, GROUND, MX-148/G: 2 | 1,2,3,4,5,6 | | | | 2-4 | |

# APPENDIX C
# MAINTENANCE ALLOCATION

## Section I. INTRODUCTION

### C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for AN/GRC-122(*) and AN/GRC-142(*). It authorizes categories of maintenance for specific maintenance functions and repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

### C-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows:

*a. INSPECT.* To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.

*b. TEST.* To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc. This is accomplished with external test equipment and does not include operation of the equipment and operator type tests using internal meters or indicating devices.

*c. SERVICE.* To clean, to preserve, to charge, and to add fuel, lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.

*d. ADJUST.* To rectify to the extent necessary to bring into proper operating range.

*e. ALIGN.* To adjust two or more components or assemblies of an electrical or mechanical system so that their functions are properly synchronized. This does not include setting the frequency control knob of radio receivers or transmitters to the desired frequency.

*f. CALIBRATE.* To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.

*g. INSTALL.* To set up for use in an operational environment such as an encampment, site, or vehicle.

*h. REPLACE.* To replace unserviceable items with serviceable like items.

*i. REPAIR.* To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes, but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than by the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.

*j. OVERHAUL.* Normally, the highest degree of maintenance performed by the Army in order to minimize time work in process is consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by maintenance standards in technical publications for each item of equipment. Overhaul normally does not return an item to like new, zero mileage, or zero hour condition.

*k. REBUILD.* The highest degree of materiel maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance category. Rebuild reduces to zero the hours or miles the equipment, or component thereof, has been in use.

*l. SYMBOLS.* The uppercase letter placed in the appropriate column indicates the lowest level at which that particular maintenance function is to be performed.

## C-3. Explanation of Format

*a. Column 1, Group Number.* Not applicable.

*b. Column 2, Functional Group.* Column 2 lists the noun names of components, assemblies, subassemblies, and modules on which maintenance is authorized.

*c. Column 3, Maintenance Functions.* Column 3 lists the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

| *Code* | *Maintenance category* |
|---|---|
| C | Operator/Crew |
| O | Organizational maintenance |
| F | Direct support maintenance |
| H | General support maintenance |
| D | Depot maintenance |

*d. Column 4, Tools and Test Equipment.* Column 4 specifies, by code, those tools and test equipment required to perform the designated function. The numbers appearing in this column refer to specific tools and test equipment which are identified in table 1.

*e. Column 5, Remarks.* Self-explanatory.

## C-4. Explanation of Format of Table I, Tool and Test Equipment Requirements

The columns in table I are as follows:

*a. Tools and Equipment.* The numbers in this column coincide with the numbers used in the tools and equipment column of the maintenance allocation chart. The numbers indicate the applicable tool for the maintenance function.

*b. Maintenance Category.* The codes in this column indicate the maintenance category normally allocated the facility.

*c. Nomenclature.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

*d. Federal Stock Number.* This column lists the Federal stock number of the specific tool or test equipment.

*e. Tool Number.* Not used.

SECTION II. MAINTENANCE ALLOCATION CHART

| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTIONS | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| | RADIO TELETYPEWRITER SETS AN/GRC-122(*) AND AN/GRC-142(*) | C | | | | | | | | | | | | Exterior only |
| | | O | | | | | | | | | | | | Connectors and cables to shelter |
| | | | C | | | | | | | | | | | Operational tests only |
| | | | O | | | | | | | | | | 2 | Shelter cabling |
| | | | F | | | | | | | | | | 5 | All tests |
| | | | | C | | | | | | | | | | Preventive maintenance only |
| | | | | O | | | | | | | | | | All servicing |
| | | | | | | | | | | O | | | 1,6 | By replacement of knobs and fuses |
| | | | | | | | | | | F | | | 3,4,6 | All repairs |
| | | | | | | | | | | | H | | 3,4,5,6 | Plus shop support |
| | | | | | | | | | | | | D | 3,4,5,6 | Plus shop support |
| | CONTROL GROUP AN/GRA-6 | | | | | | | | | # | | | | See TM 11-5038 |
| | MODEM MD-522/GRC<br>MODEM MD-522A/GRC | | | | | | | | | # | | | | See TM 11-5805-387-15-1<br>See TM 11-5805-387-15-2 |
| | RADIO SET AN/GRC-106 | | | | | | | | | # | | | | See TM 11-5820-520-12 |
| | TELEPHONE TA-312/PT | | | | | | | | | # | | | | See TM 11-5805-201-12 |
| | TELETYPEWRITER SET TT-98/FG | | | | | | | | | # | | | | See TM 11-5815-200-12 |
| | REPERFORATOR, TRANSMITTER TELETYPEWRITER TT-76/GRC | | | | | | | | | # | | | | See TM 11-5815-238-12 |
| | POWER SUPPLY PP-4763/GRC | | | | | | | | | # | | | | See Instruction Manual packed with equipment |
| | STANDING WAVE RADIO POWER METER ME-165( )/GRC | | | | | | | | | # | | | | See TM 11-6625-333-12P |
| | LOW LEVEL SIGNALING DEVICE TT-523/GGC | | | | | | | | F | | | | | |
| | AIR CONDITIONER | | | | | | | | F | | | | | Supported by MOCOM |
| | HEATER | | | | | | | | F | | | | | Supported by MOCOM |

## MAINTENANCE ALLOCATION CHART

| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTIONS | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| | AN/GRC-122(*), AN/GRC-142(*) (continued) | | | | | | | | | | | | | |
| | MOTOR, GENERATOR SS-688 | C | | | | | | | | | | | | Exterior only |
| | | | O | | | | | | | | | | 2 | |
| | | | | C | | | | | | | | | | |
| | | | | | | | | | | F | | | 3,4,6 | |
| | | | | | | | | | | | H | | 3,4,5,6 | Plus shop support |
| | | | | | | | | | | | | D | 3,4,5,6 | Plus shop support |
| | CABLE ASSEMBLIES | C | | | | | | | | | | | | |
| | | | O | | | | | | | | | | 1 | |
| | | | | C | | | | | | | | | | |
| | | | | | | | | | | F | | | 3,4 | |
| | REMOTE CONTROL BOX | C | | | | | | | | | | | | Exterior only |
| | | O | | | | | | | | | | | | |
| | | F | | | | | | | | | | | | All inspection |
| | | | O | | | | | | | | | | 1 | |
| | | | F | | | | | | | | | | | All tests |
| | | | | C | | | | | | | | | | Exterior only |
| | | | | O | | | | | | | | | | All servicing |
| | | | | | | | | | | F | | | 3,4,6 | All repairs |
| | | | | | | | | | | | H | | 3,4,5,6 | Plus shop support |
| | | | | | | | | | | | | D | 3,4,5,6 | Plus shop support |
| | CONTROL PANEL | C | | | | | | | | | | | | Exterior only |
| | | O | | | | | | | | | | | | All inspection |
| | | | C | | | | | | | | | | | Operational tests only |
| | | | F | | | | | | | | | | 5 | All tests |
| | | | | C | | | | | | | | | | Preventive maintenance only |
| | | | | O | | | | | | | | | | |
| | | | | | | | | | | O | | | 1 | By replacement of knobs and fuses only |
| | | | | | | | | | | F | | | 3,4,6 | All repairs |
| | | | | | | | | | | | H | | 3,4,5,6 | Plus shop support |
| | | | | | | | | | | | | D | 3,4,5,6 | Plus shop support |

## MAINTENANCE ALLOCATION CHART

| GROUP NUMBER | COMPONENT ASSEMBLY NOMENCLATURE | MAINTENANCE FUNCTIONS | | | | | | | | | | | TOOLS AND EQUIPMENT | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | INSPECT | TEST | SERVICE | ADJUST | ALIGN | CALIBRATE | INSTALL | REPLACE | REPAIR | OVERHAUL | REBUILD | | |
| | AN/GRC-122(*), AN/GRC-142(*) (continued) | | | | | | | | | | | | | |
| | DUMMY BOX | C | | | | | | | | | | | | Exterior only |
| | | O | | | | | | | | | | | | All inspection |
| | | | C | | | | | | | | | | | Operational tests only |
| | | | F | | | | | | | | | | 5 | All tests |
| | | | | C | | | | | | | | | | Preventive maintenance |
| | | | | O | | | | | | | | | | All servicing |
| | | | | | | | | | | O | | | 1,6 | By replacement of tools and fuses |
| | | | | | | | | | | F | | | 3,4,6 | All repairs |
| | | | | | | | | | | | H | | 3,4,5,6 | Plus shop support |
| | | | | | | | | | | | | D | 3,4,5,6 | Plus shop support |

#Indicates that maintenance guidance will be found in documents referenced in remarks column.

TABLE I. TOOL AND TEST EQUIPMENT REQUIREMENTS

| TOOLS AND EQUIPMENT | MAINTENANCE CATEGORY | NOMENCLATURE | FEDERAL STOCK NUMBER | TOOL NUMBER |
|---|---|---|---|---|
| | | AN/GRC-122(*), AN/GRC-142(*) (continued) | | |
| 1 | O | TOOL KIT TK-101/G | 5180-064-5178 | |
| 2 | O | MULTIMETER AN/URM-105 | 6625-581-2036 | |
| 3 | F,H,D | TOOL KIT TK-100/G | 5180-605-0079 | |
| 4 | F,H,D | TOOL KIT TK-105/G | 5180-610-8177 | |
| 5 | F,H,D | MULTIMETER TS-352B/U | 6625-242-5023 | |
| 6 | O,F,H,D | WRENCH 10 IN | 5120-449-8083 | |

# INDEX

By Order of the Secretary of the Army:

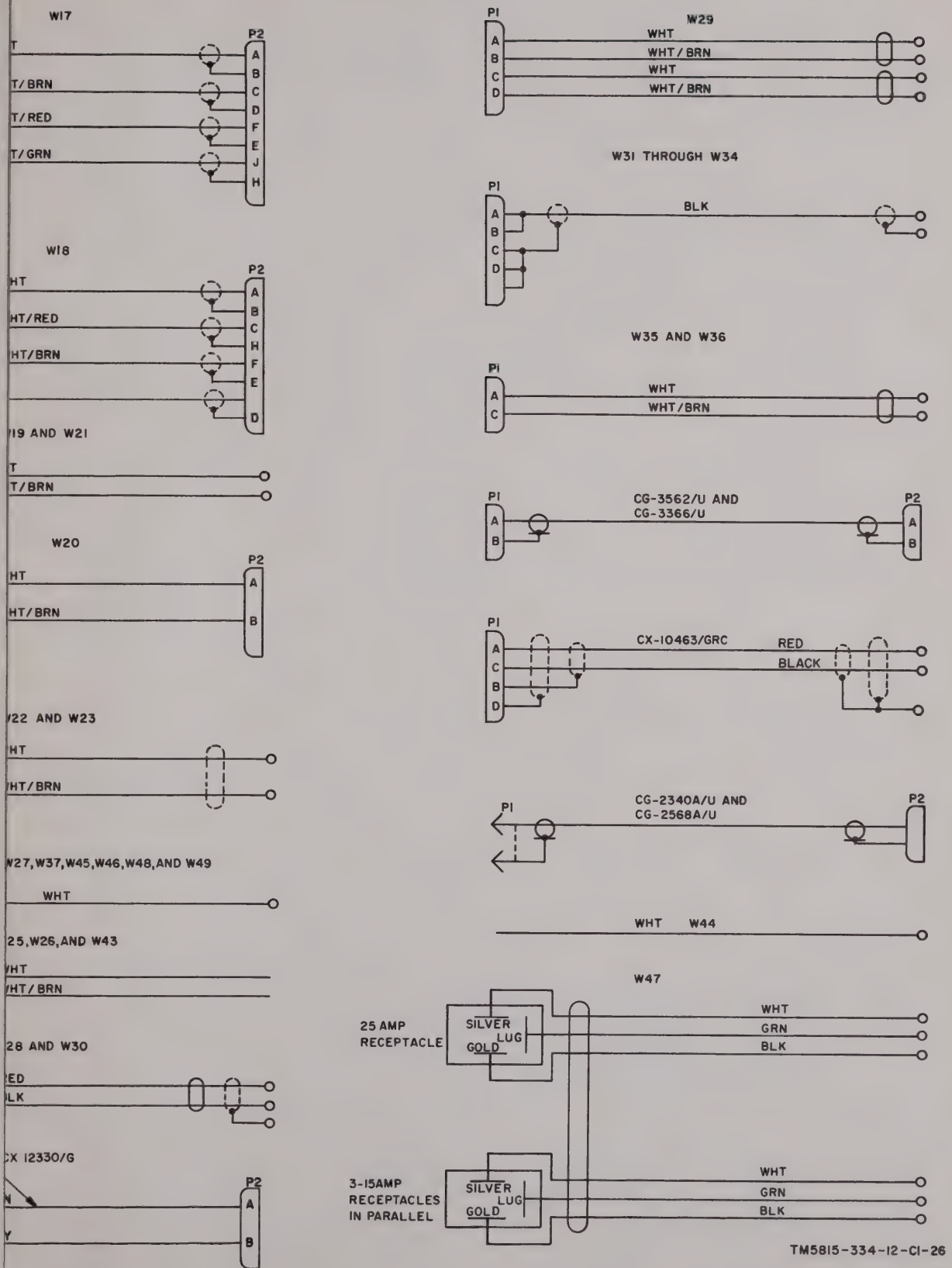
W. C. WESTMORELAND,
*General, United States Army,*
*Chief of Staff.*

Official:

KENNTH G. WICKHAM,
*Major General, United States Army,*
*The Adjutant General.*

Distribution:

To be distributed in accordance with DA Form 12-51, operator maintenance requirements for the AN/GRC-122 and AN/GRC-142 radio sets.




*st AN/GRC-142(*) or AN/GRC-122(*), schematic agram of cables.*

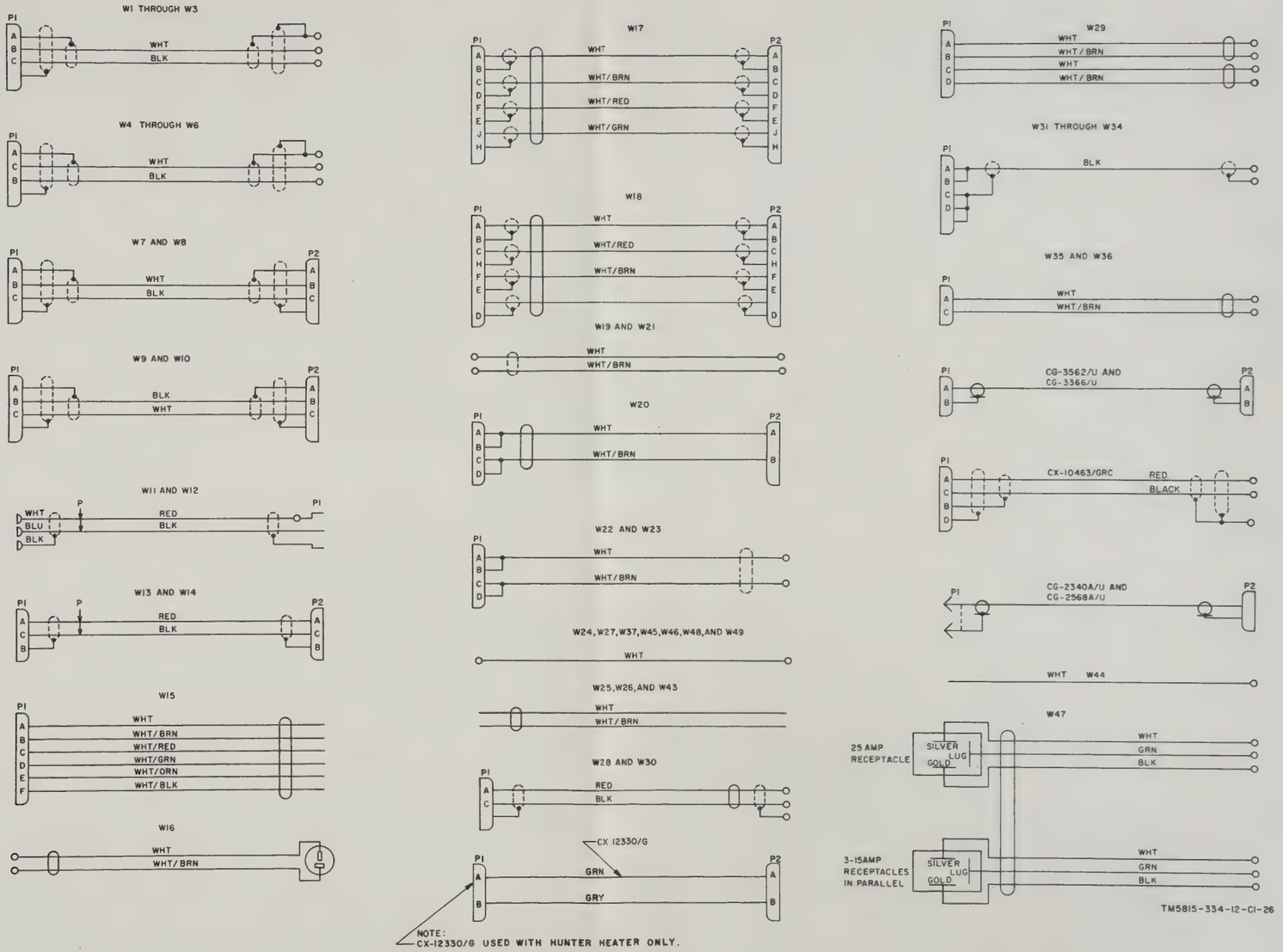



*Figure 6-1. Radio Teletypewriter Set AN/GRC-142(*) or AN/GRC-122(*), schematic diagram of cables.*

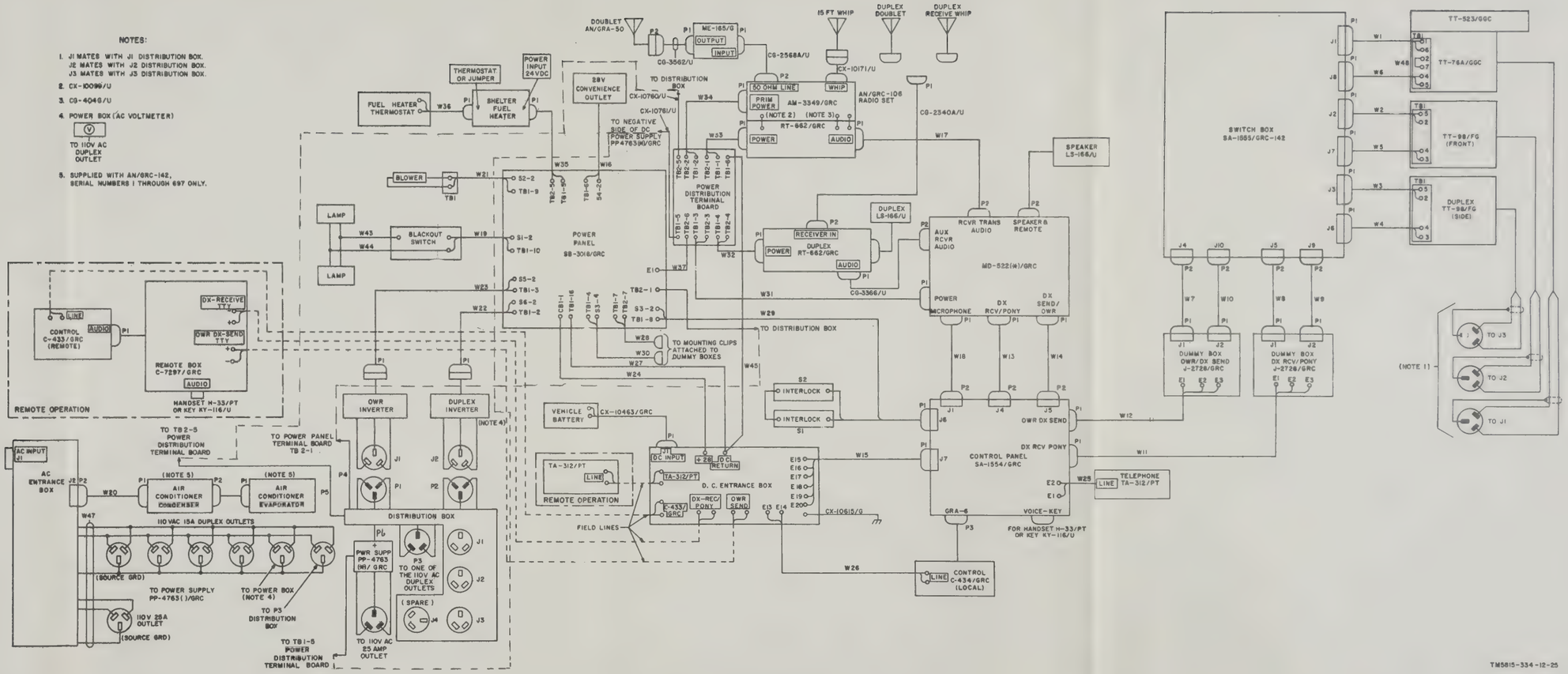



*Figure 6-2. Radio Teletypewriter Set AN/GRC-142 or AN/GRC-122, cording diagram.*

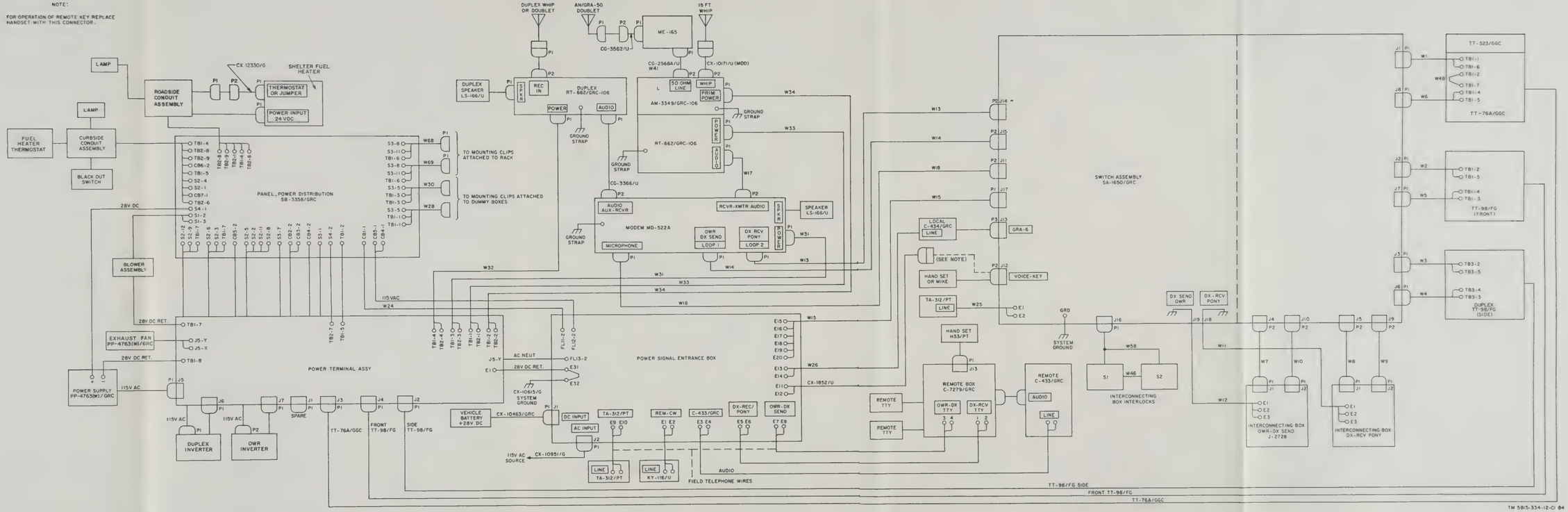
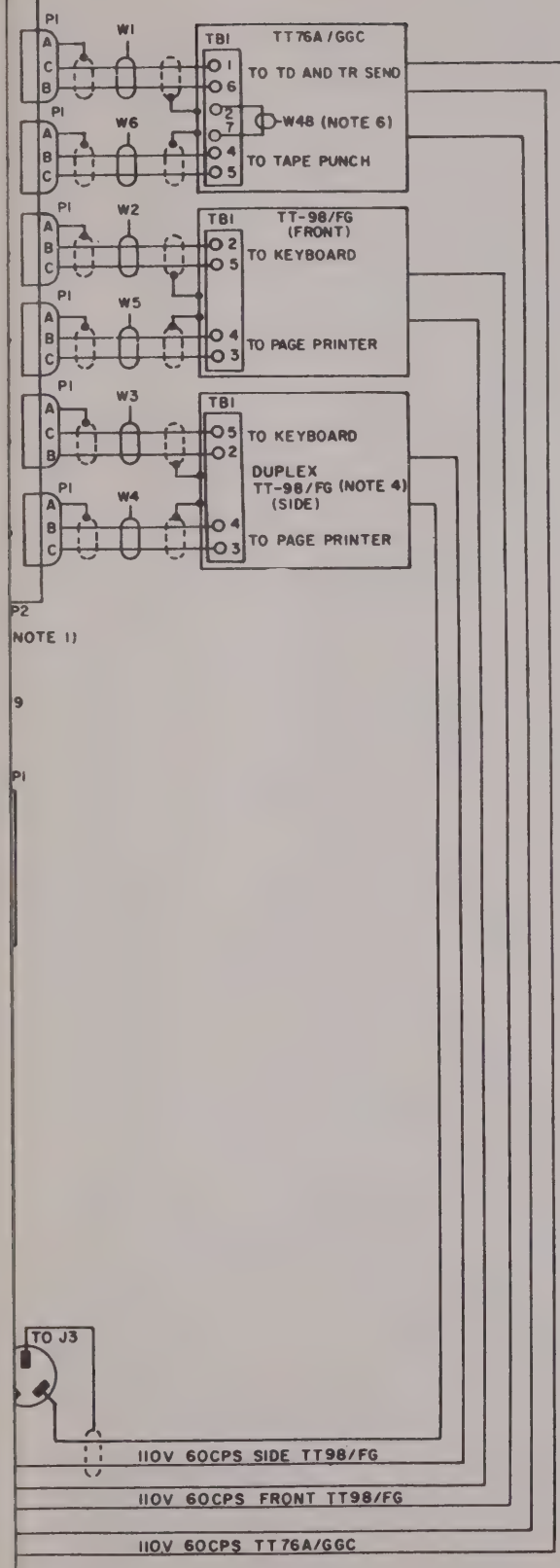
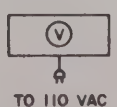



*Figure 6-3. Radio Teletypewriter Set AN/GRC-142A, -142B, or AN/GRC-122A, -122B, cording diagram.*




NOTES:

1. JACKS SUPPLIED WITH CAPS FOR USE IN SECURE OWR MODE
2. INTERLOCK SWITCHES S1 AND S2 ARE PHYSICALLY LOCATED UNDER THE OWR DX SEND DUMMY BOX AND THE DX RECEIVE PONY DUMMY BOX RESPECTIVELY. THEY ARE NORMALLY HELD IN THE CLOSED POSITION. WHEN THE DUMMY BOXES ARE REPLACED WITH SPECIAL SECURITY EQUIPMENT THE INTERLOCK SWITCHES ARE OPENED.
3. THESE ARE LAND LINES
4. THESE ARE DUPLEXING UNITS AND ARE SUPPLIED WITH THE AN/GRC-122 ONLY.
5. OPENING SHELTER DOOR BLACKS OUT SHELTER. PULLING SWITCH TO OUT POSITION RELIGHTS SHELTER LAMPS.
6. THE JUMPER (W48) BETWEEN TB1-2 AND TB1-7 IS NOT SUPPLIED WITH THE TT-76A/GGC.
7. J1 MATES WITH J1 DISTRIBUTION BOX. J2 MATES WITH J2 DISTRIBUTION BOX. J3 MATES WITH J3 DISTRIBUTION BOX.
8. CX-10099/U
9. CG-409G/U (6")
10. POWER BOX (AC VOLTMETER)




11. SUPPLIED WITH AN/GRC-142 SERIAL NUMBERS 1 THROUGH 697.

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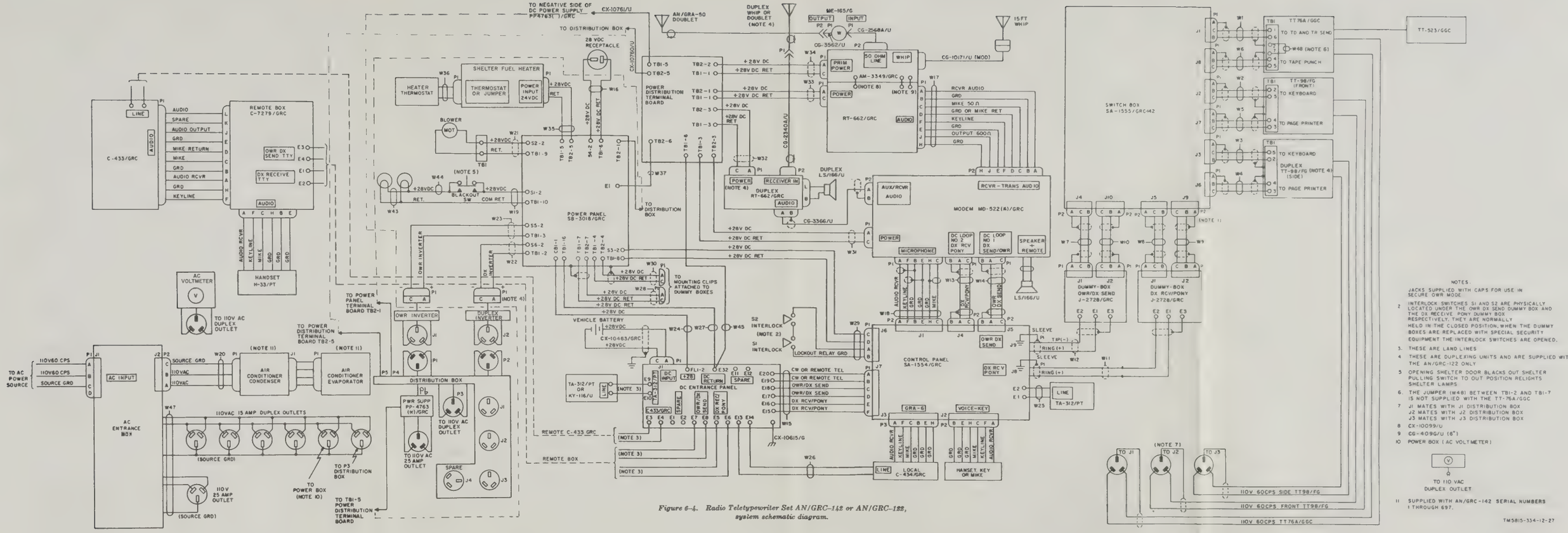
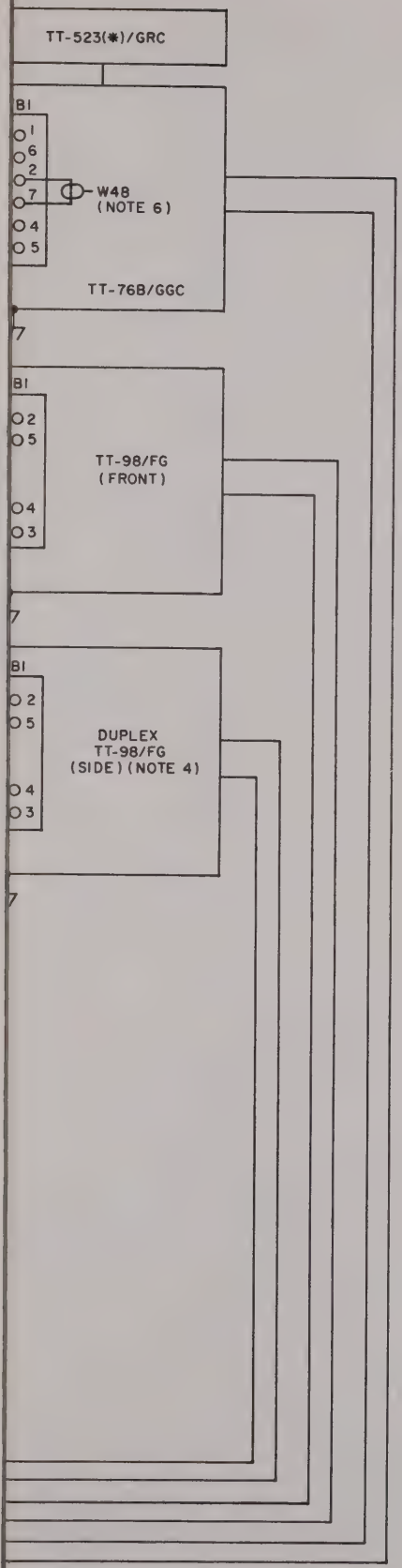



*Figure 6-4. Radio Teletypewriter Set AN/GRC-142 or AN/GRC-122, system schematic diagram.*

NOTES:

JACKS SUPPLIED WITH CAPS FOR USE IN SECURE OWR MODE.

2. INTERLOCK SWITCHES S1 AND S2 ARE PHYSICALLY LOCATED UNDER THE OWR DX SEND DUMMY BOX AND THE DX RECEIVE PONY DUMMY BOX RESPECTIVELY. THEY ARE NORMALLY HELD IN THE CLOSED POSITION; WHEN THE DUMMY BOXES ARE REPLACED WITH SPECIAL SECURITY EQUIPMENT THE INTERLOCK SWITCHES ARE OPENED.
3. THESE ARE LAND LINES
4. THESE ARE DUPLEXING UNITS AND ARE SUPPLIED WITH THE AN/GRC-122 ONLY
5. OPENING SHELTER DOOR BLACKS OUT SHELTER PULLING SWITCH TO OUT POSITION RELIGHTS SHELTER LAMPS
6. THE JUMPER (W48) BETWEEN TB1-2 AND TB1-7 IS NOT SUPPLIED WITH THE TT-76A/GGC
7. J1 MATES WITH J1 DISTRIBUTION BOX
   J2 MATES WITH J2 DISTRIBUTION BOX
   J3 MATES WITH J3 DISTRIBUTION BOX
8. CX-10099/U
9. CG-4096/U (8")
10. POWER BOX (AC VOLTMETER)
11. SUPPLIED WITH AN/GRC-142 SERIAL NUMBERS 1 THROUGH 697.




NOTES:

1. FOR OPERATION OF REMOTE KEY REPLACE HANDSET H-33/PT OR MICROPHONE M-29/U WITH THIS CONNECTOR.
2. INTERLOCK SWITCHES S1 AND S2 ARE PHYSICALLY LOCATED UNDER THE OWR DX SEND DUMMY BOX AND THE DX RECEIVE PONY DUMMY BOX. THEY ARE NORMALLY HELD IN THE CLOSED POSITION, WHEN THE DUMMY BOXES ARE REPLACED WITH SPECIAL SECURITY EQUIPMENT, THE INTERLOCK SWITCHES ARE OPENED.
3. THESE ARE LAND LINES/FIELD TELEPHONE WIRES.
4. THESE ARE DUPLEXING UNITS FOR USE WITH THE AN/GRC-122A,-122B ONLY (NOT SUPPLIED).
5. OPENING SHELTER DOOR BLOCKS OUT SHELTER. PULLING SWITCH TO OUT POSITION RELIGHTS SHELTER LAMPS WITH DOOR OPEN.
6. THE JUMPER (W48) BETWEEN TB1-2 AND TB1-7 IS NOT SUPPLIED WITH THE TT-76B/GGC.
7. THESE REPRESENT REMOTE POSITION TELETYPEWRITERS. THEY ARE NOT SUPPLIED WITH THE AN/GRC-142( ) OR AN/GRC-122( ).

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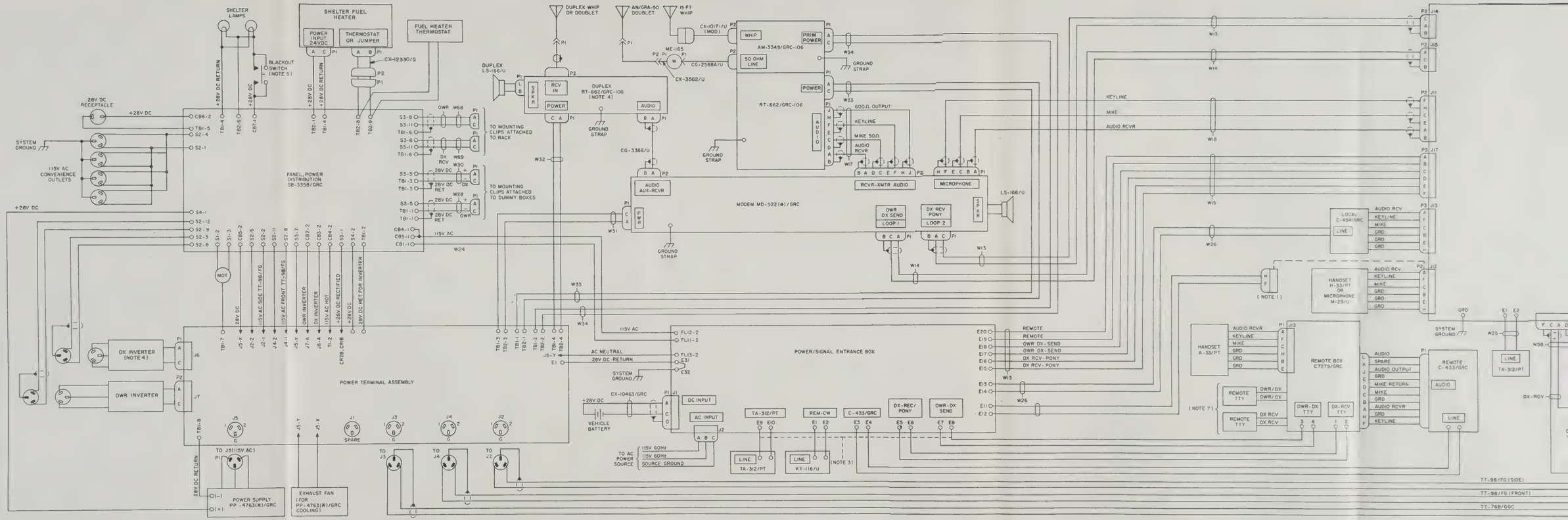
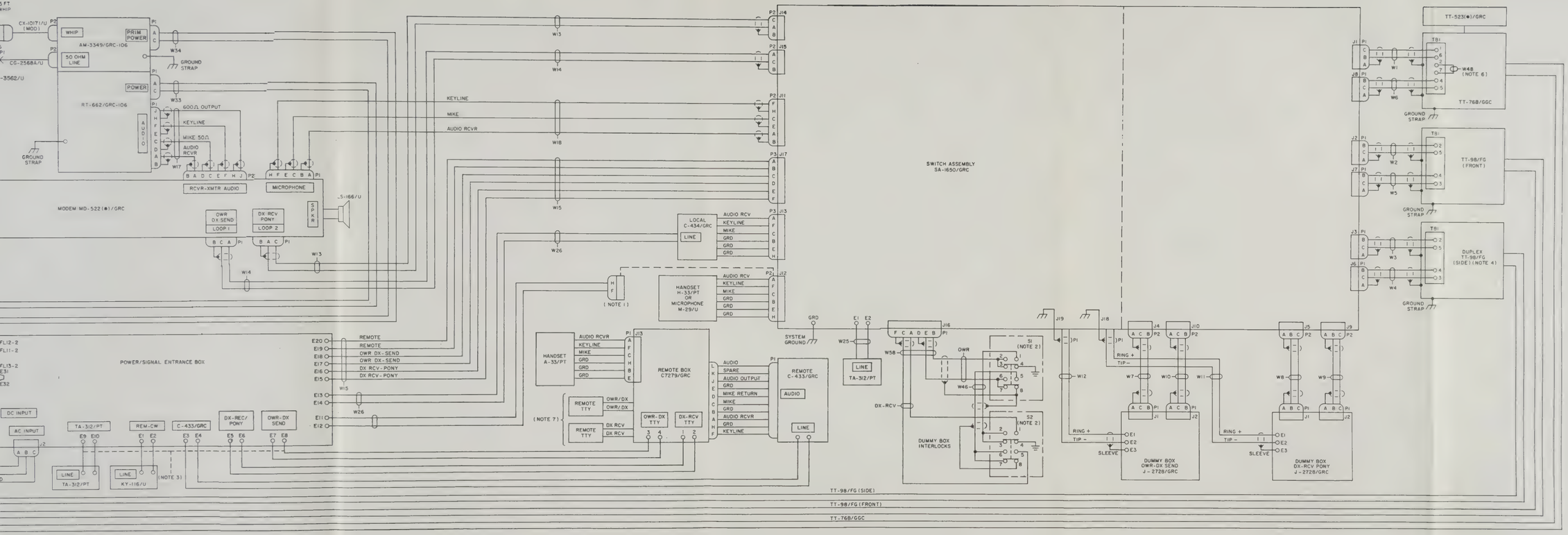



*Figure 6–5. Radio Teletypewriter Set AN/GRC–112A, –112B, and AN/GRC–122A, –122B, system schematic diagram.*




NOTES:

1. FOR OPERATION OF REMOTE KEY REPLACE HANDSET H-33/PT OR MICROPHONE M-29/U WITH THIS CONNECTOR.
2. INTERLOCK SWITCHES S1 AND S2 ARE PHYSICALLY LOCATED UNDER THE OWR DX SEND DUMMY BOX AND THE DX RECEIVE PONY DUMMY BOX. THEY ARE NORMALLY HELD IN THE CLOSED POSITION. WHEN THE DUMMY BOXES ARE REPLACED WITH SPECIAL SECURITY EQUIPMENT, THE INTERLOCK SWITCHES ARE OPENED.
3. THESE ARE LAND LINES/FIELD TELEPHONE WIRES.
4. THESE ARE DUPLEXING UNITS FOR USE WITH THE AN/GRC-122A,-122B ONLY (NOT SUPPLIED).
5. OPENING SHELTER DOOR BLOCKS OUT SHELTER. PULLING SWITCH TO OUT POSITION RELIGHTS SHELTER LAMPS WITH DOOR OPEN.
6. THE JUMPER (W48) BETWEEN TB1-2 AND TB1-7 IS NOT SUPPLIED WITH THE TT-76B/GGC.
7. THESE REPRESENT REMOTE POSITION TELETYPEWRITERS. THEY ARE NOT SUPPLIED WITH THE AN/GRC-142(.) OR AN/GRC-122(.).

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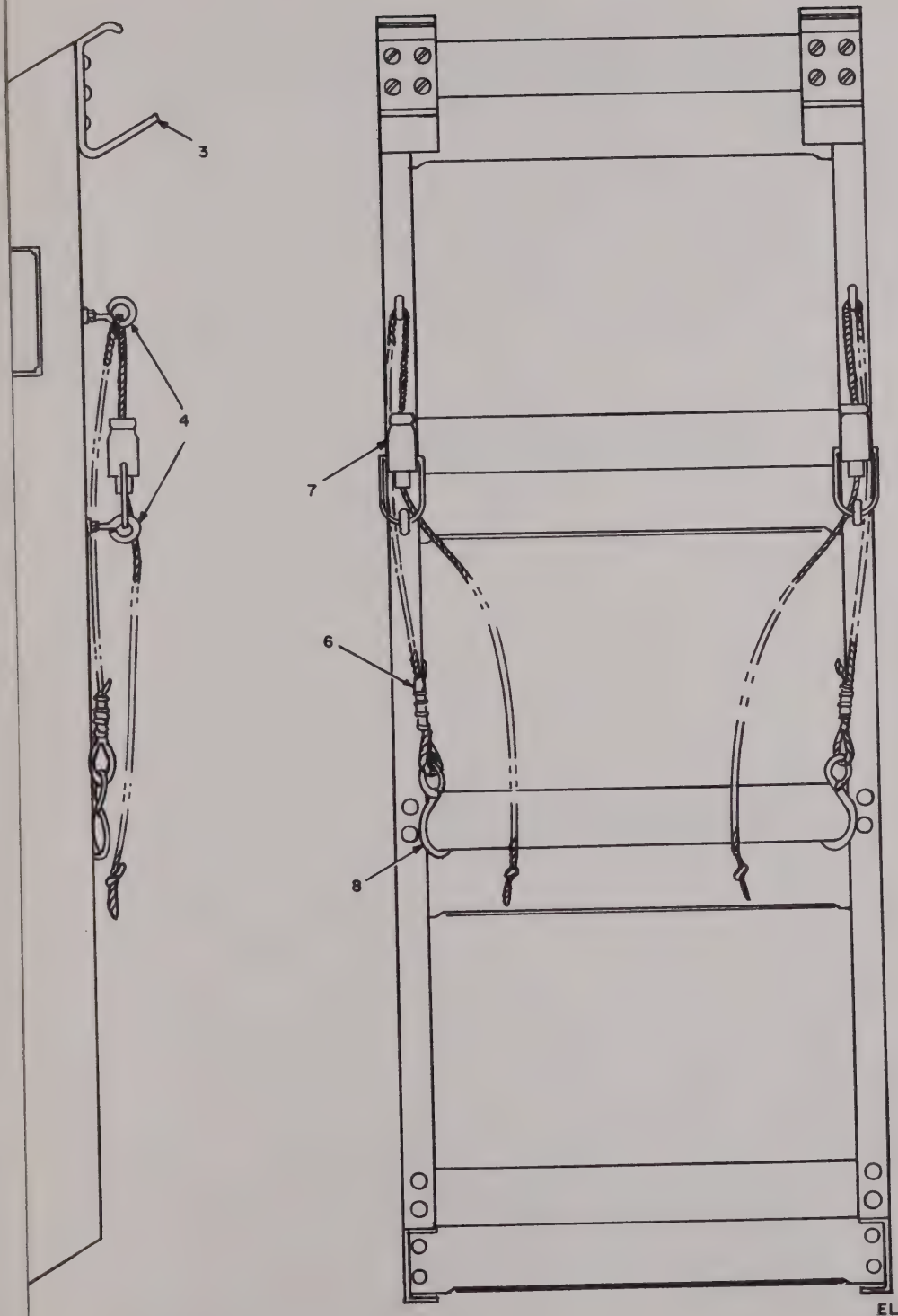
*Figure 6-5. Radio Teletypewriter Set AN/GRC-142A, -142B, and AN/GRC-122A, -122B, system schematic diagram.*




LEGEND:
1. SIDE
2. STEP
3. BRACKET
4. EYE-BOLT
5. NAME PLATE
6. ROPE
7. GUY FASTENER
8. HOOK

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*Vehicle Boarding MX-3543/G, assembly.*

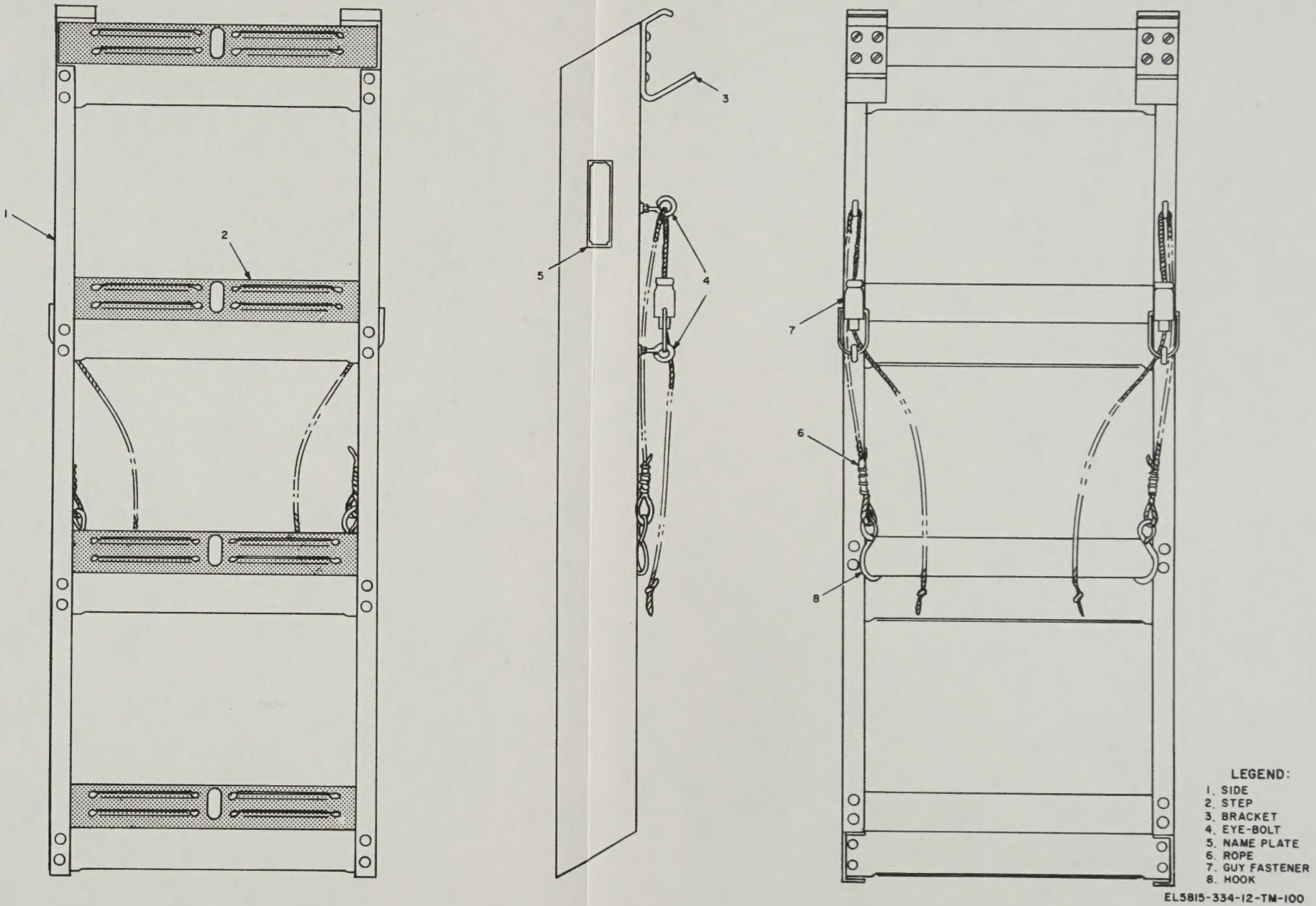


*Figure 6-6. Ladder, Vehicle Boarding MX-3543/G, assembly.*